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Blue Books made Useful.

THE recent sessions of Parliament have not been, by any means, wanting in subjects having particular interest for those who are the ordinary readers of the *Builder;* the like state of things will, and ought to, constantly recur; and the session just commenced will probably not pass by without discussion of numerous questions relating to new buildings and metropolitan street improvements, the sewerage of towns and other sanitary works, to harbours and docks, the conservation of shores and rivers, and railway communication, and to works of many other kinds, in which both the art and the structural and scientific part of architecture will be concerned. We can at once specify some of these subjects, to show the importance for us which the proceedings of Parliament now ordinarily possess; and we need not allude to increasing attention paid to education, and amounts voted for the advancement of science and art, or generally to the growth of the pursuit of "social science" in the very widest sense, not merely amongst the leaders of political parties, but as manifested in the proceedings themselves of the House of Commons and by the inquiries from time to time instituted there. We may instance the question of a new building for the National Gallery; that of the provision of quarters for the natural history collections, which, it is now decided, shall be removed from the British Museum; the question of the Government offices; that of the metropolitan street communications with reference to the present exigencies, and those further which will accrue from projected railway stations; the embankment of the Thames; the cleansing of the Serpentine; the harbour-works in progress and to be undertaken, and the fortifications, and many more that could be named. We might also refer to views that were expressed by some authorities during the progress of the strike, as to the need of further legislation, to protect the interests respectively of employers and employed. Every week, in Parliament, one or other division of the wide field, where art and practical architecture, engineering and sanitary science, are working for the national progress and the benefit of the people, is cultivated to some extent. Mistakes are made in legislation, as well as by expressions of individual opinion; but each session leaves an addition of some value to the crop of statistics and information, embodied or imbedded, in the accumulating mass of Parliamentary literature. It is our present object to inquire whether this body of matter, which has little effect in proportion to the labour and the cost with which it is got together and printed, might not be made more accessible to the class numbered amongst our readers, and of greater productiveness in results for the world at large.

The question indeed,—"What shall we do with our Blue Books?" has been often put, and not long since by Lord Stanley,—the point of whose reply in his pamphlet, however we have lost; whilst the particular suggestion we shall offer, has before appeared in print,—though little noticed and not supported by the reasons which we think may now be brought to bear in favour of it. It may be well to show what are the principal facts as to the issue of "blue books" interesting to ourselves and our readers, so far as regards the publications in recent sessions. The Parliamentary papers to which chiefly our remarks are intended to apply, or excluding the journals of the House of Commons, the Daily Votes (to which, however, are appended railway reports), the papers of the Lords, now obtainable, and the Statutes or Acts, are divided into "Reports and Papers," "Bills," and "Papers presented by command." In the first of these three divisions are comprised the returns which are made to the motions of members of the House of Commons; and the reports of Select Committees, with or without the evidence. The bills we need not further mention. The papers presented by command of her Majesty comprise copies of treaties, or correspondence, and reports of commissions, with evidence and appendices. The rule, up to within the last two years, as regards the reports and papers printed by order of the House of Commons, was to print a moderate number of copies beyond those required for the members, say in all 1,000 copies; but of the reports of commissions, often very costly, as many as 5,000 copies were sometimes ordered by those who assumed the duty of ordering, or those to whom it was left. On the occasion of the vote in 1858 by the House of Commons, of the amount, 401,357*l.*, for printing and stationery for various purposes, the case was mentioned of one report where an order for 2,500 copies had been reduced to 1,000 on the chairman's attention being called to the matter. This reminds us of an anecdote that has been told by one of the firm of Longman & Co. of a country clergyman who, receiving a request from some members of his flock that he would print a particular sermon, went into an estimate of the number of clergy in the United Kingdom, assumed (to be on the safe side) that one-half or a third would be purchasers, gave the order for printing accordingly, and was alarmed on hearing that the sale had been about twenty copies; though he was fortunate enough in having publishers who had not adhered literally to his instructions. The waste, more especially in the case of the Reports of Commissions, has been enormous; and much of the same sort of thing still must be said to exist as regards Parliamentary publications of all kinds, so long as they do not become disseminated largely, except through the agency of the butterman, and do not serve, relatively to the value of what they contain, the work of public education. It has been stated that the sum realized by the sale of waste paper has been 5,000*l.* per annum, as shown by the public accounts. Recently, restrictions have been placed upon the number of the copies printed of the "papers presented by command;" and disposition is shown in Parliament to limit the expense in other directions; but, before the alteration—not in all respects to be approved of—which limited the number to fifty, of copies of a departmental paper printed for gratuitous distribution, it was common for a considerable expenditure to have been incurred for some set of bulky volumes which not more than five or six persons read. The Report of the Commission on Endowed Schools (Ireland) cost 5,201*l.* 2s. 2d. for printing and paper only. There were four folio volumes, each of 600 pages, as stated, the paper weighing thirty-four tons. The copies printed were 4,250 of each volume; but no English or Scotch member sought to obtain a copy, and the chief application of the outlay seems to have been the supply of 104 copies to Irish members. We have now before us returns of the cost of paper, printing, and binding, each paper "presented by command," during the sessions of 1856, 1857, and 1858. They are defective so far as they do not state the number of pages in each report, so as to allow a full examination of the items named, but it appears that in the last of the years the amount, 29,331*l.* 8s. 5d., was spent in those items, on such papers, by the authority of nine Government departments. In February, 1859, it was stated in the House of Commons that the expenses of printing amounted to 150,000*l.* or 160,000*l.* a-year. It must be recollected that neither of these statements covers the office expenses, as of the commissions, which must amount to the largest sum. The Report on Metropolitan Main Drainage, by Captain Galton and Messrs. Simpson and Blackwell, wanting the usual index, thus cost the country 8,836*l.*; and, apparently, printing and paper not included. The Report, subsequently, of Messrs. Bidder, Hawksley, & Bazalgette to the Metropolitan Board of Works cost between 2,000*l.* and 3,000*l.* Is it likely that any multiple of 17s., or the price at which each copy of the Government Blue Book was sold, realized by such sale, would deserve a moment's consideration? The matter of the Blue Book, at least what was appended to the Report, was matter calculated to be of the utmost service in the settlement of the sewerage question, if perused by all who were giving thought to that subject, and were capable of making suggestions, whilst avoiding such loose and ill-considered ones as were substituted by correspondents of the newspapers. Yet, an outlay having been incurred, enormous in amount, but which we assume and believe to have been an outlay necessary and judiciously incurred; just so much of a tax is imposed as will defeat the object and render impossible the benefit, and not return a single hundred pounds of that expenditure. It is not surprising that the real value of such Blue Books is little known, and that the very matter which they contain has to be again and again got together by committees and commissions,—to increase *unnecessarily* expenditure, and swell the mass of printed matter obstructively to future investigation.

The figures we have given, and the known facts that the vast majority of the papers, from mere mass, are not and cannot be read by members of Parliament, and only go to form a heap to be cleared away and become the perquisite of a footman, who gets at most 28s. per cwt. for them as waste paper; and that, notwithstanding, some of those of permanent interest are quickly not to be procured; show that some change of system is needed to render justifiable the expenditure. Rightly, the course is not to stint the expenditure in the first instance; but to take means to insure that the particular object of the publication is attained. Such means are not to be found in the purchase of copies by the public, albeit the nominal price may be fixed low; because, first, there is not and cannot be sufficient information given by advertisement, of the nature of the matter, or even of the publication, of these papers; and, secondly, because, taking into consideration the number of the papers on a single subject, and the actual cost of some of them, or such as have plans, the expense does stand in the way of the dissemination and proper utilization. It frequently happens that just when the value of the paper becomes known to the public, the price has risen from causes to which we have alluded. Thus it has been stated that a report on stone (perhaps that on the stone for the Houses of Parliament) which was published at 6d., would now fetch a guinea. There are several such cases: the report of the commission on iron applied to railroad structures, is hardly procurable at any price; and the money value of particular papers, or the costliness of a set on any subject, is, from the nature of the circumstances, rapidly increasing. To obtain all the reports on harbours, or on workhouses, or prisons, would require a small fortune: yet no architect or engineer can feel that he has possessed himself of his subject till he has either himself gone through such documents, or is assured that he has the result of a similar operation of research and analysis performed by others. It is obvious, therefore, that there must be some contrivance better calculated for the educational object, than such a one as the refusal to medical men who have contributed matter to the Registrar-General's reports, of copies of those reports. The fact that the object for the nation is not primarily the reduction of cost of

the printing and paper, was pointed out by Mr. D'Israeli, some time ago, and must be admitted. We have shown that the representation, as contained in the Treasury minute of November, 1858, in answer to Dr. Pickford, of Brighton, that the weekly reports of the Registrar-General could be bought for 1½d., and the quarterly reports for 4d., is by no means an accurate one of the point at issue, as it concerns ourselves, and the profession we represent. The Main-Drainage Report alone, as we have said, was issued at 17s.: and we repeat that, whoever has sufficient interest in such papers to read them, is generally one who can give some return to the nation, far greater in amount than the price which legislative or departmental narrow-mindedness so much fears to lose. The object for Government and Parliament should be, not to impose any tax whatever on the use of the publications, though it is necessary to check abuse and waste: but the object should be to get the books read. People usually do not buy books, even at the cost of mere pence, unless with some view, to be furthered by matter which the books are supposed to contain; and they want preliminary information. Such information of what is to be found in parliamentary publications, given on their appearance in the newspapers, is much confined to subjects which happen to have been prominent; and the omission is not supplied by the lists of the printer to the House of Commons, which are little known, and, for the publications of past sessions, have to be very much improved, as well as cheapened, to make them of the proper use for purposes of general reference. One new and comprehensive catalogue is required; but arranged with divisions, as alphabetical and classified; and better models for these could not be found than Mr. Woodcroft's catalogue of patents. A list which is regularly announced as comprising the titles of papers of several sessions, was not purchaseable at our last application; and, to show that improvement in other respects is required, it may be sufficient to state that on another occasion, when papers were wanted by us for immediate reference, our messenger was put off to the following day, either for the convenience of those in charge of the papers on sale, or from defects in the system of arrangement and cataloguing. The daily journals, when they mention publication of a parliamentary paper that would be interesting to ourselves, confine themselves to a paragraph which often omits much that may be technical, but is at the same time of great value to particular inquirers. Our remarks as to the defects of the catalogues are not intended to apply to those indexes which are appended to reports themselves: these are prepared with great labour and skill—it is unnecessary to say to those who have occasion to use the class of papers; and without them, usually, the evidence and other data, often more deserving of attention than the mere compromise of opinion which forms the report, could be turned to slight account.

The importance of the dissemination of the matter of parliamentary papers has been so far seen by many persons, as to have led to suggestions for the gratuitous supply of these publications to popular institutions, in the same manner as the specifications of patents are now supplied, through the exertions of Mr. Woodcroft. But few of those institutions, and as a rule not those which exist in rural districts, have the space for even a moderate proportion or selection of the papers, or would appreciate them or any similar class of literature. Certain individuals would be interested in particular subjects; and the populations in some localities would feel interest in what concerned their means of livelihood, or their own condition. In such cases, however, the object would be better obtained by sale of the papers, than by the other opportunities given; but towards this there must be some better devised means of advertising the matter of the publications than is now comprised in advertising some of them. Again, it has been thought that certain learned societies, or persons requiring such papers really for a scientific or literary object, should be allowed to prefer a claim to have them gratis; but to this it is replied, that the money payment (here considered as small in amount) affords the only security that the papers will be valued and turned to their intended use, and likewise that the time of public officers would be taken up in determining what individuals or societies were entitled to the papers, or in answering applications; and that it is impossible to draw any line between the different classes of persons. To this it may be observed, that the point we now advance, one apparently somewhat at variance with views held by those who are disposed, praiseworthily enough, to check the waste, is that it would be better that no amount whatever should be realized towards cost of paper and printing, and which return yet we apprehend is insignificant, than that the objects, educational and otherwise, justifying the publication, should be in a great degree limited or impaired. We do not profess to know whether the fifty copies before alluded to as still printed "for gratuitous distribution," are absorbed by the requirements of the Government offices, or departments themselves: we only know that none of these, however important the subject-matter to architects and engineers, ever reach ourselves without purchase or sending for them; and we think that the Institute of British Architects, and the Institution of Civil Engineers, are in a similar position. Surely this, which at least occasions delay, and also operates as an impediment to the diffusion of information and opinion, if not by ourselves, by many who would be contributors of information to the general fund through the medium of our pages, might be corrected; for, we need only instance the daily papers, to show how necessary it is that contributions and correspondence, resulting in this supposed case from the "blue books," should be added to the exertions of those whose difficult duty it is to get to know, first, what has been published, and then what the publication contains. Only five persons having read a particular "blue book," no result may have been obtained to compensate for the cost; but a method might easily be suggested by which the publications could be made accessible to a much greater number of persons not members of Parliament, with the probability that amongst the number would be found five who would have time and ability to digest the matter of the reports, and to produce work of some description that would contribute to progress, and alone justify the national expense.

Our suggestion, therefore, is, that, whatever be the course maintained in reference to the gratuitous distribution, there should be established a public library devoted specially to Parliamentary publications. This institution might be most conveniently located in the neighbourhood of the Houses of Parliament: it should be open throughout the year, might be a lending library, and should be at least as accessible as the reading-room of the British Museum: it should contain perfect sets of all the past publications, several copies of each of recent issues, well-compiled catalogues, and every convenience for writing and reference. We would include in the collection, or the reading-room, some maps, and statistical charts, and books of reference, such as commercial and geographical dictionaries, without, however, losing sight of the main and definite object. There might also be arrangements for the display of maps, showing lines of railway, and other works before Parliament. We would further include in the collection all documents and reports of importance, relating to the metropolis, not presented to Parliament, such as reports presented to the Common Council of the City, to the City Commission of Sewers, to the Metropolitan Board of Works (with all the drawings and specifications for sewers and streets), to the District Boards, and of those Metropolitan Water and Gas Companies who might be disposed to contribute. It is obvious that then the expense which is involved in printing, might be reduced without detriment, and might be avoided altogether, in some instances, by the substitution of an attested manuscript copy of the return which a member now often moves for, more for his own information than for an object which would immediately require the expense of printing. It has several times happened of late, that a member of Government has had to appeal to the forbearance of a member of Parliament, against what seemed a waste of public money, though the object of the motion for the return was admitted to be a proper one, and important to the public. We believe also that with the public eye constantly upon the matter of "blue books," a more efficient check upon the printing of returns previously printed, would exist than is to be expected from the librarian of the House of Commons, if he be now charged with any duty in the matter.

It may be remarked that the objects of such a library as we propose, are attained at the British Museum, where there are preserved copies of all Parliamentary publications. The fact, however, that there the papers are not obtainable immediately on publication, or at the time at which much of their chief interest exists, is an answer to such an argument: besides, the extent of a large general library, excellent as is the management of the Museum reading-room, causes much delay to students and inquirers, and has been the reason for our arguing on several occasions in favour of other libraries devoted to special subjects, such as those already existing at South Kensington for books on art; at Jermyn-street, on general science; and at the Great Seal Patent Office for its class of subjects. No change should be made in the system of supply of the papers to the British Museum, unless for diminishing loss of time there; but special libraries, that we now recommend, as well as others of a different sort, should be multiplied: they would result in great progress as regards the subjects themselves, and they would lessen the inconvenience at the British Museum. It is true that access may be obtained to the libraries of the two Houses, by persons engaged in business before Parliament; but this involves difficulty, and obviously would not suffice for the public object in the matter above dwelt upon.

We had thought of giving a list of titles of recent papers on subjects in which our readers are interested; but some of them have been mentioned by us on publication, and we have no further space at present. We have, however, we hope, succeeded in showing the importance to our readers which there is in this matter of our present article, and that the interests of the tax-paying, whilst enlightened, public, are all in favour of the dissemination of parliamentary publications, rather than in the concealment of their light, which we apprehend would be involved in the narrow view of the money expenditure. We have shown, however, further, that there is one simple mode by which the light may be further disseminated, whilst the expense is even reduced; and we hope that our observations may attract the notice of Mr. Wm. Ewart, or some member of the committee of the House of Commons, appointed the other day to assist the Speaker in matters relating to printing.

ON THE RATIONALE OF GOTHIC ARCHITECTURE.

MR. SCOTT'S FIRST LECTURE AT THE ROYAL ACADEMY.

IN my former lectures I have endeavoured to trace out the history of that course of transition by which the rude arcuated architecture which prevailed in western Christendom during the Dark Ages, between the fall of the Roman empire and the rise of modern civilization, commonly known as the "Romanesque" style, first emancipated itself from its semi-barbaric character, and became a consistent round-arched style, and subsequently, by a perfectly logical series of changes resulting from the suggestions partly of scientific construction, and partly of artistic refinement, developed itself into that new, original, and beautiful style which has in more modern times received the very absurd, but now unavoidable, name of *Gothic* architecture.

Having traced this development up to what I consider to be its culminating point,—the form which it arrived at towards the end of the thirteenth century,—it had been my intention, before I proceeded further with the historical view of the subject, to have given a series of short practical treatises on several of the more important ele-

ments of the style whose history I have traced out; as, for instance, on the principles of Gothic *vaulting*, on *tracery*, on the system of *mouldings* belonging to the style; on *roofing*, on architectural *carving* and *sculpture*, &c., &c. Circumstances, however, having rendered it impracticable for me just now to devote to it the time which would be necessary to do justice to these subjects, I purpose on the present occasion to content myself, at the risk (I may say with the *certainty*), of repeating what I have already stated, with an inquiry into the *rationale* of the style of architecture of which I have been treating.

Such an inquiry is the more necessary from the extraordinary contrariety of opinion which we find to exist as to the real character of the style, as well as the external and internal causes of its development. Such opinions assume the most contradictory forms. One class of them may be denominated the *religious* view of the question. Under this head one party describes it as Christian, and another as Roman Catholic architecture. One attributes to its various parts a deep symbolization of Christian truth: another discovers in them nothing but the mystic arcana of Romanism; while another cuts the knot by protesting that it is Mahomedan architecture. A second class of opinions assumes an *ethnological* form. Under this head some have thought the style especially English; some pre-eminently German; some, again, in the most exclusive and straightened sense of the term French, and others in the widest sense, Teutonic; while the entanglement is again cut through by the champions of the *Saracenic* claim.

Then comes a *political* class of disputants. One declares the style to be nothing more or less than the visible exponent of feudalism. If the system of Durandus were applied to this view we should perhaps have the orders of the arch shown to represent the divisions of feudal aristocracy. The point of the arch to be the king; the outer voussoirs the great, and the inner the lesser vassals; the clustered pillars to be the bishops surrounded by their clergy; the ashlar stones the freemen, the rubble stones the villains and serfs, and the mortar to be the bond of union or of slavery by which the whole system was cemented together; and the painted glass to be that clerical monopoly of learning by which the pure light of knowledge was imparted through an artificially coloured medium. Others have, however, shown that the style developed itself just when feudalism was giving way, and just among those very communities who were most resolutely exerting themselves for its overthrow; and that, in England especially, it synchronizes with the foundation of those institutions to which we owe our liberties and our greatness; while our knot-cutting friends would contemptuously pooh-pooh the whole question by saying that it had nothing to do either with feudalism or Magna Charta, but was simply the natural result of the Crusades.

Again, as to its more practical characteristics; one party claims for it the most unbounded liberty, another denounces it as curbing the free following of practical and artistic requirements. The very same party sometimes describes it as excluding the light of day, and sometimes as offering no protection against the glare of sunshine. In fact, without going further into these contrarieties, it may be sufficient to say that among those who have not gone much into the subject, no opinions are too inconsistent either with one another or with facts to find ready advocates.

My object in this and the succeeding lecture will be to show that the style originated in no occult influences; that if it can be called either Christian, Teutonic, French, English, German, or Western European, it is so only in a plain, straightforward, and historical, and not in any hidden, exclusive, or mysterious sense; but that it, in fact, arose from the application of plain common sense to plain practical requirements; that many of these requirements were not peculiar to the period, but belong to all time; that many were not limited to a race or climate, but are common, with certain modifications, to different races and countries; and that the application of the same class of common sense to altered requirements would produce results by no means militating against those thus arrived at, but, on the contrary, tending to enrich, to amplify, and to add new life, variety, and harmony to the art which it had first suggested.

To judge of the practical reasonableness of a style of building, it is not enough to prove that it answers its purpose: we may presuppose that all civilized people would effect as much as that,—indeed, that all people would do so who can construct at all; for if uncivilized, their aim would be more simple and more readily attained.

The question is, whether the purpose is provided for by means consistent with common sense, with the laws of nature, with the properties of the materials at hand, and without an expenditure of labour and material disproportioned to the result. In this I do not restrict the question to merely utilitarian results, but admit the artistic element in a degree proportioned to the rank and purpose of the edifice. I would also wish to guard myself against being understood to imply that the superior reasonableness of a style of architecture proves a higher state of civilization among the people who use it. Inventions are often accidental, and independent of high civilization. Thus, though an arch is a more rational means of spanning a wide opening than a single block of marble, the early Romans who used the arch were probably much less civilized than the early Greeks, who were ignorant of it.

The Egyptians and the Greeks used most nobly the means of spanning openings with which they were best acquainted, and for which their numerous quarries of granite and marble supplied them so liberally with the materials, but such a mode of construction is manifestly costly,—dependent upon natural facilities of the most exceptional kind, and extremely limited in its application. The use of the arch obviates all these difficulties, and consequently a mode of construction which admits the arch is more rational than one which does not;—Roman architecture, in short, than Greek.

The Romans were, in fact, eminently a practical race, and their architecture is in its construction in a high degree practical and rational: they by no means limited themselves to the use of costly and bulky materials, but united in their structures the use of all the materials of which their world-wide dominion gave them command, and were equally successful in employing in them the most stupendous masses of marble, as at Balbec, the granite of Egypt, or the flint-nodules of Kent; and never hesitated at spanning the widest structures with vaults or domes of such solidity as almost to defy the ravages of the elements and of time.

The two great defects in the *rationale* of their architecture were—first, that, as the conquerors of the world, the resources at their command were so unlimited that economy of material seems to have been almost dismissed from their consideration, and their principle of statics seems to have been rather that of passive and inert resistance than of equilibrium of forces; and, secondly, that having adopted the artistic features of Greek architecture, they attempted to unite them with their own totally different system of construction, in a manner which cannot always be said to be consistent with reason.

When the nations of modern Europe began to emerge from the chaos of centuries, and to generate for themselves a new civilization, their aim, as regards architecture, seems rather to have been the recovery of ancient Rome, which they may all along be considered to have continued a dormant state of existence, than to generate a new style for themselves; but their limited resources, and unfamiliarity with what is now denominated "classic" art, freed them from the tendency to follow their great masters in the two defects which I have mentioned. True, they often built with needless massiveness; but this was not the result of profuseness, but of want of experience; and when they imitated or re-used the details of Roman architecture, they applied them with more regard to practical utility than to classic precedent.

At first the Romanesque builders were at a low level, both as to constructive and artistic skill; but all their efforts being directed to practical improvement, they, in course of time, succeeded in generating a very consistent round-arched style in which every feature may be said to have resulted, in a greater or less degree, from practical reasoning on immediate requirements and on their experience of preceding defects.

The observations I have to offer on the developments thus reasoned out are intended to apply mainly to those of the countries north of the Alps, but may in many points be found to be of general application.

One of the first practical principles aimed at throughout the whole range of Mediæval architecture was so to arrange their designs as to facilitate the use of small materials, and to render themselves independent of the accident of having quarries at command which would supply vast blocks of stone. It happened that in the great seats of early art this was of less consequence, for both Egypt, Syria, Greece, and Italy contain such quarries in tolerable abundance, though even the Romans resorted to concealed arches for the security of their architraves; but in northern Europe, though building stone in most parts abounds, it is quite exceptional to find it at once in blocks of great dimensions and of strength which would render it a trustworthy covering to openings of any considerable bearing. With all our increased facilities at the present day, we never find the trabeated system carried out in its integrity when on a large scale: either the middle stones of architraves are suspended by concealed arched joints, as is the custom here, or are visibly arch-jointed, as in France, or the entire architraves consist of brick arches plastered over to mimic the construction they affect, but cannot follow. Even in our Gothic buildings, where every facility exists for the use of moderate-sized stone, it is often with much difficulty that blocks of a size suited to all purposes can be obtained. Thus with the Houses of Parliament, after the whole kingdom had been ransacked by a geological commission, not only was the quarry they recommended summarily rejected as incapable of furnishing stone of any reasonable size, but the second quarry, which was adopted in its place, and which produced an admirable material, was, after a time, abandoned and a third selected, the productions of which have, in other respects than size, proved so lamentably inferior. The fact is that it is only here and there that we find quarries uniting *quality* and *size* which suit even our moderate requirements; and if such is the case now with all our mechanical advantages and facilities of transit, how much more must it have been felt in days when the mechanical appliances of the ancients had been in a great measure lost, and the Roman roads broken up, while the means, which were to supply these deficiencies, were yet in their infancy.

While, then, *at all times* and *everywhere*, it is a desideratum to a rational system of construction, that it should offer every facility for the use of ordinary and easily-obtained material, such was the case in a more than usual degree in these early ages of modern art.

Though the universal use of the arch by the Romanesque builders obviously promoted this object, it would not of necessity lead to its fullest attainment. Arches may be, and often are, constructed of enormous blocks of stone, and it had to be studied how to make good construction with small materials.

The most obvious means of doing this, was by building the arches in *rims* as we do our brick arches,—a deep arch, consisting of several distinct arches laid one over the other, each forming the centre on which the next is built. By this mode of building, an arch of any degree of strength may be built of stones of the most moderate dimensions. This system consequently became general in the Romanesque buildings.

Now, a deep arch so constructed, and built square through the wall, has a heavy, clumsy appearance, and forms a dark and cavern-like recess. You may ornament the voussoirs, and vary their colour as you please, but still it is heavy, wanting in play of light and shade, and obstructive to the free passage of the rays of light. This was early felt and early obviated.

In an arch built in several rims, it is not necessary that any but the outer rim should be of the full width of the wall. This suggested the system of *subordinating* the rims, or recessing them one behind the other, so as to divide the arch into what are called orders.

This gives us at once a new and beautiful mode of arching, economical, and adapted to all varieties of material, giving great play of light and shade, offering the greatest freedom for the admission of light, and suggesting (as we shall see), a perfectly new system of decoration.

This division of the arch into receding orders necessitated a corresponding form in the piers which supported it.

The first means of relieving the plainness of this block-form, was the introduction of an impost at the springing, defining the line which separates the pier from the arch. Afterwards the orders of the jamb would receive pilaster-capitals, and finally, decorative columns would be inserted in their place;—thus completing the general idea of the pier and arch as made use of during the Romanesque period.

The arch itself was at the same time subjected to various systems of decoration suited to its *normal* construction.

It is clear that the extreme angles of the orders contribute but slightly to their strength. These might, therefore, be rounded, chamfered, or moulded at pleasure. It became common to form them into large rolls between two hollows, and also to cut the order into various mechanical or other forms, as zigzag, &c., &c., according to the

fancy of the architect, from which arose the whole system of Romanesque arch decoration, and as the junction of the arch with the wall above was but slightly marked by the change in the direction of the joints, a small projecting moulding was introduced between them, which we call the drip-stone or label, which not only drew the line more emphatically, but also served to prevent the water which ran down the face of the walls from discolouring the arch mouldings.

It will readily be seen that this logical and reasonable mode of constructing arched openings, would, when applied to arches carried on pillars, lead to the clustered column.

If the wall was not thick, the arch might certainly continue to be of one order, and the most natural mode of supporting it would then, as heretofore, be a single column. Where, however, the wall was so thick as to give it a clumsy look if the arch ran square through it, it would be divided into two orders, and would assume at its springing a cruciform plan. The impost must break round this figure, and though the column might still remain (and often did remain) round the abacus, only assuming the cross-form, the most natural thing would be to form a complex pillar, composed of four shafts united in one, each apparently supporting its own order of the arch.

If the arch were divided into three orders, a more complex form suggested itself, containing eight shafts; and as the system was carried out many other combinations arose not necessary to enumerate.

Thus we see that the adoption of the arched system of construction, unbiassed by any pre-existing laws of art, but aided only by the very rational desire to utilize the materials most abundantly provided by nature, led to two of the most important characteristics common to Romanesque and Gothic architecture, viz., the subordinated arch and the clustered column, with the whole system of decoration derived from them; than which no two features can be pointed out which have been more richly fruitful of architectural forms, the most original and beautiful.

Again, in the mode of bringing down the arch upon columns the Romanesque builders exercised a sound discretion. The Greeks and Romans in their trabeated construction, reasonably enough, made their architraves only as wide as the upper diameter of their columns, so that whatever projection the capitals had from beyond the shaft they had the same beyond the architrave also. When, however, you substitute two arches for two architraves, you bring down the weight by two opposite forces; its footing, therefore, on the capital requires as much steadiment as possible.

The Romans, as many of their modern followers, were for a time so inconsistent as not only to limit the arch, like the architrave, to the thickness of the upper diameter of the column, but actually interposed, without a shadow of use, a bit of entablature between the column and the arch; thus, instead of doing all they could to give steadiness to the spring of the arch, they made it as tottering in its construction as possible. This was corrected by the Romans of the Lower Empire, and the arch was placed by them, as reason would dictate, directly upon the capital, or (still more sensibly) on a strong flat impost laid on the capital, and for this most reasonable step they have in after ages been pronounced barbarous. The Romanesque architects, taught by common sense rather than by precedent, followed their example. If they imitated or re-used the Corinthian capital, they laid upon its fragile abacus a more trustworthy impost, and to give greater steadiment to the foot of the arch they made it somewhat wider than the diameter of the column,—a practice which pervades Mediæval architecture, and contributes greatly both to its good construction and its beauty.

The system of constructing *doorways* is directly derived from what I have already described; as many recesses being given to the jambs as the arch has rims,—and these decorated with columns if thought good. The head is often filled in with a tympanum supported by corbels in the jambs, both as a field for sculptured decoration, and to make the door itself square instead of arch-formed. If this is not done, the inner arches are made to spring from a higher level, to allow the doors to open without catching against them.

The windows show the same regard to reason. The inside is nearly always widely splayed, to spread the light equally in the room. The external recess depended partly on the degree of architectural character aimed at, and partly on the depth required for the arch. Where the openings were but narrow and the resources small, one arch-rim would suffice, and this would often be chamfered at the edges to prevent obstruction to light.

If the opening were wider, and so required a deeper arch, or if the architectural effect aimed at were greater, we find two or more such orders as the above, with, perhaps, columns supporting the outer ones, the receding orders, in either case, doing away with undue obstruction of light or view: the cill always well sloped, to throw off the water, and having usually a string course below, to prevent it from running down and discolouring the walls. In all this, strict regard to practical reason and utility is manifest: every step is argued out on the basis of construction and requirement, and every decoration is founded on, and results from, the conclusions come to on these practical grounds.

In domestic architecture, if a window were beyond the width of a single casement, a small pillar was often interposed, and the inner order of the window was divided into two arches, while the outer one, if there were any, was in one, the casements or shutters falling into rebates in the back of the column, by which a window of double the width which would otherwise be conveniently attainable was produced. In window-like openings in which glazing was not needed—as in triforiums, cloisters, and screens—this system was used for beauty where not demanded for the same reasons as in windows, and the subdivisions were often increased to three or four under one comprising arch.

In other instances of the same kind, where light arcading was needed, as in cloisters, and the wall was too thick to rest upon a single capital, two small columns were placed one behind another, or a sort of bar or double corbel placed on the capital of a single pillar to support the springer of the arch, for the sake of avoiding the use of thick piers, which were not needed for strength, and would obstruct view and light; and all these practical contrivances were made elements of beauty and varied effect.

Another legitimate exercise of reason, on the part of the Romanesque builders, was the rejection of the fixed rules of proportion observed by the ancients between the diameter and height of their columns. These rules were good in their place, but they had been worked out for a totally different system; and we know that the ancients themselves were anything but so slavish in their adherence to them as their modern imitators. In a purely arcuated system, however, it became clear that such rules were out of place and inconsistent with reason. Circumstances, in a majority of cases, prescribed the height of a column, from reasons wholly irrespective of the question of its load. It followed then, that the diameter must be regulated rather by the load than the height, so that every variety of proportion became admissible. Take, as an example, the crypt under the choir of York Minster. Its height being prescribed by circumstances, and the portion of it required for the vaulting being fixed by the width of the arched bays, it followed that the height of the columns was also rigorously defined; but some of these columns had to carry those of the church above, and with them the whole superstructure, while others had no load but the vaulting of the crypt and the floor of the church. Surely, then, the simplest exercise of reason dictated that their diameters should vary with their load, irrespective of their height. The system of clustering columns both helped to moderate the extremes of such variation in proportion, and, at the same time, introduced still wider liberty; for, though a pier destined to carry a vast load might be subdivided, and its apparent proportions thus lightened, the individual shafts of which it was composed not having each its own proper load, might be viewed as decorative only, and be made exceedingly thin for their height. The use of such thin shafts did not, however, originate in the Middle Ages. Canina shows, in his work on Domestic Architecture decorated with Ornaments of a Light Form, that it was frequent among the ancients, though not often adopted by modern Classic architects. Even for really constructive pillars, it is admissible where the material is of remarkable strength, as in the case of metal columns, and in a less degree with those of marble or granite, where the load is very small; but it is especially so where the columns are of a decorative rather than a functional character, in which case it is not only lawful, but correct to show this by making them of slender proportions. The liberty, however, which I here defend, must, as all other liberty, be kept within reasonable bounds, and must be regulated by a correct eye and sound judgment.

Another sound exercise, as I think, of reason and liberty, which was universal among the Romanesque and Byzantine architects, was the departure from the rule of the ancients that all capitals and other recurring objects of a like nature should be worked to one and the same pattern. It may be that the unity of a colonnade, united by a single and unbroken entablature, demanded this. I am not finding fault with it in Grecian or Roman architecture; but where the capitals are separated by arches, or did not form a continued range at all, the effect would be most painfully monotonous if the sculptured capitals were all alike, as if cast in a mould by the hundred. We accordingly find it established as a universal law that, though moulded or other mechanically-formed capitals might, if you please, be alike, no such slavery should be imposed upon the sculptor; but that he should have the fullest scope, within the reasonable limits suggested by the requirements and the general balance, and harmony of mass and outline, for the freest exercise of his own imagination.

Now, though these and other developments of the Romanesque period were founded on a thoroughly practical and logical course of reasoning, it by no means follows that a perfected form of arcuated architecture had yet been arrived at any more, than that the decorative system had been brought into a thoroughly refined or artistic form.

Towards the middle of the twelfth century the efforts of the architects were redoubled towards the attainment of these two objects, and the advancement made, both in correcting defects in construction and refining the decorative system, were most strenuously followed up, and all improvements made were founded strictly on reason. The great constructive difficulty met with, arose from the powerful outward pressure of the round arch when of great span, or carrying any great load, and especially so when used in situations where it was difficult to give it any very massive abutment.

The cases of failure from this cause were most frequent, so much so, that, besides the numerous instances recorded of buildings, wholly, or in part falling from the failure of the arches, we find among the buildings still remaining abundant evidences of the insufficiency of the round arches for their load, and of the abutments to resist their pressure. In ordinary architecture we cannot, as in bridges, viaducts, &c., give our arches an unlimited abutment proportioned to the pressure whatever it may be; we are limited in our means of doing this by innumerable causes: thus, in a central tower, if the arms of the cross have aisles, the natural abutments of the tower arches are reduced to the frail aid of a continuous arcade upon detached pillars; and even if there are no aisles, the abutting walls are perforated with windows. The abutments, again, of a chancel arch, are perforated either by arches or windows, while the gable over the arch loads it heavily at its weakest point. The abutment of an arch, again, has often to infringe upon a pier at half its height, as in the case of a nave arcade abutting upon the detached piers of a central tower. In all such situations the undue pressure of the round arch was found to be most prejudicial. Still more strongly was it felt where the nave was spanned by stone vaulting. The Romans had got over this, as in the baths of Diocletian, by breaking the continuity of the aisles by vast abating walls across them. But in a church this was impracticable. Its uses demanded continuity of aisle, and moderation in the size of the pillars. Failures often occurred from these adverse causes, and the ingenuity of the architects was naturally directed to obviating the defect.

I have, in a previous lecture, described the series of tentative experiments, all of them dictated by constructive and practical requirements, by which it was attempted to avoid these difficulties, I will not weary you by recapitulating them. The two obvious desiderata were an arch of less pressure, and an abutment of greater resistance; and these were the two objects aimed at in most of the succeeding developments. The first demand was met by the pointed arch; the second by the systematized use of the buttress, whether of the solid or arched description. It was perfectly well known that the outward thrust of an arch diminished as its height increased; that the resisting power of an abutment depended mainly on its extension in the direction of the pressure; and that where sufficient extension of abutment could not be obtained without inconvenience or dissight, the deficiency might be compensated by loading it from above; and by arguing on these three facts, the constructive characteristics which distinguish Gothic from Romanesque, or the pointed arched from the round arched Gothic, were logically worked out.

The strictly mathematical mode of increasing the height of an arch, would, I suppose, be by using a semi-ellipse, its major axis being vertical. The form is, however, most unpleasing to the eye, and troublesome in execution from its constant variations of curvature, so that by far the most natural and practical means of effecting the object, is the adoption of an arch of two centres, or what is commonly called the "pointed arch." We accordingly find, as I have shown by ample evidence in a former lecture, that this form was in the first instance used just in those situations in which a reduction of outward pressure, or an increased power of bearing weight were of the greatest importance. I have shown that this form was not adopted at first as a matter of taste, of fashion, or of fancy; nor even, as has been suggested by a highly talented writer, as a means of meeting the difficulties arising from the varied arches of vaulting, but simply from *structural* and *mechanical* necessity. It matters not, whether the form was new or old, whether it occurred to them without external suggestion, or whether they saw it in the East, in their own intersecting arcades, or in the first proposition of Euclid. It was not the seeing of it in any such manner which caused its introduction, but the simple fact, that they had arrived in the course of their constructive development at a practical problem of vital importance, which *absolutely demanded* the pointed arch for its solution.

The first situations in which the pointed arch was substituted for the semicircle are the wide spanning arches of vaulting, and the arches carrying central towers and gables. We next find it in the wide arches of nave arcades, and it is not, as a general rule, till it became customary in these positions where it was demanded for practical reasons, that it began to be used as a matter of taste in other positions.

Having secured the first object—an arch of reduced pressure—the second, viz., the abutment of increased resistance was attained by the systematic development of the buttress,—a feature very much neglected by the Romanesque builders; and, as the vaulting of a lofty nave could not be directly supported by the ordinary buttress, the arched or flying buttress was introduced, spanning the aisles and conveying the pressure to the buttresses beyond. That this was introduced for utility only, and not from taste, is proved by the attempts in early instances to conceal it, so that we may with certainty conclude that all these beautiful features of Gothic architecture originated, not from taste or caprice, but from reasoning upon practical and urgently pressing constructional requirement, and that the beauties to which they gave rise proceeded from the application to them of the great principle of Gothic architecture, the decoration of constructive or useful features.

Let us, however, suppose for a moment that our building is not vaulted, but has timber roofs; there still remains an advantage in the use of the pointed arch. If it has, for instance, a central tower, the demand for an arch of reduced thrust is still greater than if the church had been vaulted, for the arms of the cross from their reduced weight are less effective as abutments.

The chancel arch, again, demands height, and the more so if it be wide, as in our own day is necessary. The nave arcades are better pointed than round, as are any others carrying any considerable weight. Buttresses remain necessary at the ends of the arcades, and are desirable as a steadiment to the outer walls, particularly where roofs without a direct tie are made use of, and are further useful as permitting the introduction of larger windows than might be safe without them. In all cases, indeed, where roofs or floors are so constructed as to concentrate pressure upon points, it is clear that buttresses are desirable; and when the efficient size cannot be given them without inconvenience or dissight, it is equally clear that the deficiency may be readily compensated by loading them with lofty pinnacles. It is wrong to use buttresses without any object but appearance, but there are numbers of cases where they are of great advantage besides those in which we know them to be indispensable. If so many of our arched and vaulted buildings in these days were not mere pretences in lath and plaster

we should have more practical experience of the need of the buttress and of the pointed arch. I was once told by the English commissioner in Scinde that the European engineers had difficulty in making the native builders there believe that any but a pointed arch will stand.

Let us now inquire as briefly as may be into the rationale of *ribbed* vaulting, as distinguished from the arris vaulting of the Roman and earlier Romanesque builders.

A groined vault does not of necessity demand the use of ribs any more than the plain waggon-head vault. Even the latter was from an early period frequently divided into compartments or bays by transverse ribs, which were useful as a means of giving it rigidity, but in *groined* vaulting they were of nearly constant use both for the same reason, and because the vault, being reduced at its springing to so narrow a footing required this additional strength. The arrises, however, or diagonal lines of intersection were always left without ribs.

Why, then, was the custom changed? For two important reasons. The first was this: that the intersection forms naturally a feeble line both from the difficulty, particularly with the rough materials usually employed, of making its construction sound; from its forming an arch of greatly increased width without corresponding increase of height, and from its reduction at the springing level to a pin's point.

The second was of a more intricate nature, and requires to be explained more in detail. When the two intersecting vaults of a groin are similar and equal in their section, the line of intersection falls in a plane. When vaulting, however, became general, all sorts of irregularly-formed spaces would have to be so covered, and would present problems of considerable difficulty, in which it would be impossible in all cases that the vaulting surfaces should be portions of cylinders or regular cylindroids, and in which the intersecting lines could not, without much twisting of the surfaces, be brought to fall into planes.

The introduction of the diagonal rib met both of these difficulties. It strengthened the weak angle and gave it a substantial footing; and it at the same time gave to the lines of intersection a certain degree of independence of the vaulting surfaces, so that instead of the surfaces governing the intersection they were thenceforth governed by the ribs, and the latter could be made to fall into planes and to avoid unsightly forms even in vaulting spaces of the most irregular and abnormal forms.

The substitution of the rib for the arris worked as great a revolution in the principles of vaulted construction as did the pointed arch itself. Nothing in the way of vaulting was now impracticable or unsightly: the architect was absolutely master of his work, and could do what he liked with it. The facilities it offers are quite marvellous in the eyes of the modern practical man when once they are opened to them. I have myself found one of the most practical men I ever met with, who had for years taken the leading management of the business of the greatest builder of our day, though hitherto uninitiated in Gothic construction, almost in ecstasies at finding a difficult problem in vaulting he had been puzzled over for days and making models of in vain, solved in an instant by seeing the absolute liberty of action exercised in a similar case in Westminster Abbey. The old builders themselves perfectly luxuriated in their newly-discovered liberty: not only could they vault spaces of any conceivable plan, every dimension and angle of it varying, and the difficulties increased by the necessity of pushing up windows in its sides in all kinds of difficult positions; but they could make the result so pleasing and apparently so straightforward and natural, that not one observer out of a thousand ever finds out that there was any difficulty to be got over at all. Sometimes, indeed, we find them rejoicing so much in their freedom as to set themselves needless puzzles for the very luxury of solving them. There is a most remarkable instance of this in the crypt under Glasgow Cathedral, where the pillars which support the floor have been placed in a variety of intricate positions for no reason but to produce curious perplexities in the vaulting, and creating strange problems for the mere pleasure to be derived from their solution and the beauty of the puzzle when solved.

It has been argued that the Gothic vault is less refined than some of the previous forms, because less strictly mathematical; that a refined system of construction should in all cases possess an exact mathematical solution, though the builder may, when once master of the true theory, depart from it in execution; that the work, in short, though irregular in execution, should be perfect and mathematically accurate in its theoretical type.

I agree with this doctrine in the main; but I hold that the Gothic vault complies with its conditions.

The square-groined vault, with semi-circular arches, is perfect in its theory, and gives elliptical arches for its arris lines. The same, if vaulted with the pointed arch, is equally true in theory, for the diagonal ribs may be pointed arches, formed each of portions of two ellipses. The oblong vault, again, is perfect if the wide arch is a semi-circle, the narrow one a vertical semi-ellipse, and the arrises horizontal semi-ellipses of the same height; but the ancients generally chose to stilt the narrow arch instead of using the vertical ellipse, and by doing so threw the diagonal arris out of the plane and out of shape; but the theoretical form remained, nevertheless, perfect. In like manner, if the same figure be vaulted across its widest span by a pointed vault, and if the narrow vault have a pointed arch composed of two portions of ellipses, and the intersections be of the same figure as resulting geometrically from the intersection of the two vaults, the theoretical form is perfect. Now, if in either case the architect thinks the elliptical pointed arches inferior in beauty to those composed of parts of circles, and by using ribs finds himself enabled to throw the error resulting from the substitution of the latter form into the vaulted surfaces where it will be invisible, surely he is only using that discretionary power of introducing irregularities upon a perfect theory which is claimed as his right; and this is exactly what the Gothic architects introduced.

The fact is that, besides its unpleasing form, especially when the major axis is vertical, the use of the ellipse entails such an annoying series of difficulties as greatly to increase the trouble and consequent cost of execution. The constant change of curvature, the troublesome methods of striking it, and of finding the true lines of the arch-joints, not to mention the mathematical fact that the same joint line is never true both for the extrados and intrados, and that, if the rib mould remains unchanged in depth, the extrados and intrados cannot be both true ellipses at all; all these furnish quite sufficient practical reasons for its rejection in cases where, not only is there no necessity but an abstract mathematical idea to be satisfied by its use, but the beauty of the work is greatly improved by dispensing with it.

Though the pointed arch was introduced from purely constructive reasons, there was another of a more æsthetical nature which rendered its adoption more general when once introduced. It was a double one: not only did the general tendency towards lofty proportions render it necessary to make use of an arch more in harmony with the general feeling of the architecture, but the rejection of a fixed code of proportions for pillars and other parts demanded for the arch an equal power of varying its own proportions. The semi-arch is absolute and invariable, and though the use of smaller segments would meet the case in one direction, there were no means of proportioning it to features of *increasing* height. This was attempted both in Romanesque and Byzantine works by the expedient of *stilting*, but this is, after all, more a semblance than a reality. As in cases already cited the mathematical solution of the problem is the ellipse; but only imagine any thing so unpleasing as a series of elliptical arches placed the length-way upwards! Good taste would not suffer it; but the pointed arch at once met the difficulty. To illustrate my meaning I will beg you to take an internal bay of a Norman Cathedral—and to suppose yourselves to have to increase its height throughout in the ratio of one-third.

You, first, after setting out your widths as in the original, increase the whole height and that of each story by one-third: you then increase the pillars and the jambs of the triforium and clerestory windows in the same proportion: this brings you to a stand, for the arches being semicircles are invariable. Either you must leave them unaltered and throw all the extra height into the wall above them, or you must stilt them each to the extent of one-third of their height; unless you can make use of an elastic arch which will change its proportion at pleasure. The ellipse occurs and meets the case, but it offends your eye. At length, however, the pointed arch suggests itself and gets rid of the whole difficulty. So similar are a Romanesque and an Early Pointed bay in all other respects, that the change of proportion which I have described seems at once to effect the whole change in style.

Had the constructional motive alone existed, the pointed form would have been confined to arches of considerable span, but the demand for a variable arch adding æsthetic to the constructional claim, caused its speedy adoption in positions where strength alone would not have demanded it, though the semicircle, the plain segment, and the segmental pointed arch, were, at all subsequent periods, of the style used side by side with the true pointed form.

I have been the more particular in showing the true reasons for the change in the form of the arch, because the great majority of writers treat it purely as a matter of taste, and of altered fashion; indeed, two generally excellent writers on the history of Mediæval architecture have strangely imagined that the pointed arch had a greater outward thrust than the round, and that the increased projection of the buttresses was necessitated by its use: instead of the two being simultaneously introduced as a double means of avoiding the evils experienced from the great thrust of the round arch and the small buttresses by which it had during the Romanesque period been accompanied.

I will now close my present lecture, but hope in the next to carry on the same inquiry into a number of other details, as well as into the general spirit and principles of the architecture of which I am treating; and to add some practical remarks on the application of the rationale thus traced out to our present revival of the style, and such developments as it may give rise to.

ON THE CONSTRUCTION AND REBUILDING OF THE ITALIAN OPERA HOUSE, COVENT GARDEN.*

IT having been represented to me that some description of the recent rebuilding of Covent-garden Theatre might prove interesting to members of the Institute, I have readily consented to place them in possession, as far as it lies in my power to do so, of all the means adopted to that end; and, although I could certainly have wished that the task might have fallen to some one less directly interested in the matter than myself, I am the more disposed to address myself to the question from a feeling that our transactions ought to contain not only those interesting essays of an archæological character which are so extremely valuable to all of us as artists, but should also have a claim to be considered as in some measure a record of contemporary works, more particularly with reference to the peculiarities of modern building operations. Acting upon this principle, I propose to confine my observations to-night almost exclusively to the constructive features of the new theatre, merely glancing at its architectural character in those cases where its form and appearance have been directly influenced by means of a peculiar or utilitarian character. And before I enter upon my description, I must, to prevent misapprehension, state distinctly that I claim no novelty or peculiar merit for any of the methods of construction adopted; and if, as must be the case, many present may find much to criticise and probably to condemn, I can only plead that, owing to the limited time allowed for the work, the imperious necessity of action has often interfered with that calm reflection and discriminating thought which are necessary for the production of any noble and enduring work. My object, therefore, is, not in any way to forestall criticism, but simply to lay before the members of our profession some more authentic accounts of the progress of the works of the new theatre than they have been able to obtain from the newspapers, some of which have even informed a curious public that the building was erected with hot bricks and boiling water, while others have contained descriptions more creditable to the imaginative than the scientific element in the minds of their writers.

Covent-garden may almost claim to be considered by Londoners a household word, as far as theatrical associations are concerned,—a theatre having existed on the site for nearly a century and a half. The first playhouse of which we have any records was commenced in 1730, and opened in 1733,—the distance from the stage to the back wall of the boxes being 54 feet or 55 feet, which dimension was then considered large. The theatre was erected to rival Drury-lane, and from that day to the present a constant competition has been carried on between the two great dramatic houses. After extensive alterations and a partial rebuilding, in 1792, the theatre was burnt to the ground,—the cause of the fire remaining, as is not uncommon in such cases, an unsolved mystery. The last representation was "Pizarro," in which many guns were used; and it was thought that ignited fragments of the wadding might have settled upon inflammable portions of the scenery or decorations, and thus have caused the catastrophe. Be this, however, as it may, the destruction of the building was complete, and nothing remained to be done but rebuild. The proprietors decided on the latter course, and were fortunate enough to secure the services of Sir Robert, then Mr., Smirke, from whose designs and under whose guidance was erected, in less than one year, the admirable theatre so lately destroyed by the same element which had proved so fatal to its predecessor. Sir Robert Smirke's design is so well known to you that I need not describe it further than to say, that whatever may be our opinion of the applicability of such forms of architecture to the purposes of a theatre, we must all feel that Sir Robert Smirke, while adopting the style fashionable at the time, brought to its execution a thorough knowledge of its capabilities and details, combined with most eminent constructional skill. I mention this the rather, because I saw, with regret, some time since, allusions made to bad construction, as evidenced by the use of wood bond in the walls by Sir Robert. Doubtless, this is a mode of building very faulty, and now very properly discarded; but, as regards the bonds at Covent-garden, they were only in the insides of the walls, and used, apparently, for convenience in fixing finishings; and as they were only half a brick wide, the strength of the thick walls of four or five bricks was but slightly diminished. In all other respects, the construction of Sir Robert Smirke's theatre appeared to me excellent; and the arrangements of arches and voids, piers, and footings, were such as might be most advantageously studied by the architectural student, while the great thickness and solidity of the walls were such, that in removing them, the contractor for the excavations often found many reasons to wish their construction had been of a less permanent character. The first stone of the new theatre was laid on the 31st December, 1808, by his Royal Highness the Prince of Wales; and a brass box containing a bronze medal, with the Prince's portrait upon it, and a selection of the current coins of the day, was placed under the foundation-stone at the north-east corner of the building, where it was found by the workmen engaged in removing the ruins. The theatre was opened on the 18th September, 1809, having occupied only eight and a half months since the laying of the foundation-stone. The cost of the building was, I believe, 180,000*l.*; and on the occasion of opening an attempt was made by the management to raise the prices of admission about 30 per cent. This was resisted by the public in a manner to which we are happily unaccustomed, and the famous O. P., or old price, riots ensued, and continued about two months. During their occurrence the performances were impossible. Placards of the most ludicrous and offensive descriptions were hung out from all parts of the theatre: the performers were interrupted by continual noise and missiles; and a kind of combined movement among the rioters, termed the "O. P. Dance," rendered all restoration of order impracticable. It might have been hoped that such a mode of evidencing dissatisfaction by the public had become obsolete, but it may be questioned whether we have much to congratulate ourselves upon as an improvement, if we have only banished it from our theatres to permit it in our churches. So long continued and so determined were the riots at Covent-garden, that the proprietors were at length obliged to make a compromise, after which the performances were per-

* Read at the Royal Institute of British Architects, by Mr. E. M. Barry, as elsewhere referred to.

mitted to go on without interruption, and the theatre was used for English dramatic representations until a few years ago, when it was determined to convert it into an Italian Opera-house. To carry out this resolution, extensive alterations were required, both as to the form and size of the auditory, and they were placed under the professional guidance of Mr. Albano, who gutted the audience portion of the theatre, and rebuilt it according to his own designs. I have had prepared plans showing the old theatre, the re-arrangement by Mr. Albano, and the new Opera-house to the same scale, in order to facilitate comparison of their respective sizes. Mr. Albano's alterations consisted, as may be seen, of an enlargement of the auditory, both longitudinally and transversely, and of some modifications of the entrances and staircases rendered necessary thereby. The theatre, as altered, was opened with the opera of "Semiramide,"—in which Grisi and Mario filled the principal parts, and when Alboni was first introduced to a London audience,—and it continued from that date till the time of its destruction to be devoted to the purposes of the Italian opera, with occasional performances of other kinds during the recess of the opera season. The fate of so many theatres, however, soon overtook Covent-garden; and, in March, 1856, it was burned to the ground, during the absence of Mr. Gye, in Paris, and while it was temporarily occupied by Anderson, the so-called "Wizard of the North." The fire was supposed to have first arisen in the carpenter's shop, in the roof, but the uncertainty attending its origin has never been satisfactorily cleared up. In noticing the catastrophe, it must be felt that the subject of fire-proof theatres is one well deserving the attention of members of our profession. At present, so regular a fate appears to hang over these buildings, that it is almost considered a matter of course that they should be burnt down. The fires at Covent-garden have been already alluded to. Drury-lane was burnt down in February, 1809,—not more than five months from the destruction of its rival. The King's Theatre (as her Majesty's Theatre was then called) was burnt some years before, and Astley's, the Strand, the Olympic, and, I think, some others, have been burnt down in our own times. The peaceful pulling down of the Old Adelphi, to make room for its present graceful and commodious successor, is an event not often paralleled in theatrical annals. Those who have had opportunities of inspecting the working of theatres can be at no loss to account for their danger; but though much peril might probably be removed, there are few places where innovation is less welcome than within the walls of a theatre; and many prejudices will have to be removed, and many novelties introduced, before the public can possess a place of entertainment absolutely fire-proof, although much may be done, and, in fact, has been done, both at the New Adelphi and Covent-garden, to reduce the danger and to protect life. The spectacle presented by the gigantic ruins of Sir Robert Smirke's theatre, after the fire, was very striking. The massive walls and heaps of rubbish, with here and there huge fragments overturned by the firemen, reminded the spectator of some of the ruins (such as the baths) of ancient Rome, while the picture of destruction and desolation was enough to cause despair to most men who looked at it with a view to rebuilding an opera-house upon the same site. Mr. Gye, however, with characteristic energy and decision, soon entered upon the arduous task; and, to his great ability and untiring exertions, the public are indebted for the existence of the present structure. The ground landlord, the Duke of Bedford, gave every facility for proceeding with the enterprise, and has taken much interest in its accomplishment. By the conditions of the lease, his Grace is entitled to a private box and anteroom, with a separate entrance from the street. These are obtained adjoining her Majesty's box and entrance; and, owing to the limited space available at this part of the house, their provision was attended with some difficulties. The anteroom is in the portion of the house behind the curtain, and is approached from the ducal box by a sort of covered bridge thrown over a corner of the stage. The design of the building had also to be submitted to his Grace's approval, and it was made a condition of the latter that the exterior should be covered with Portland cement. It will be readily understood that many difficulties had to be encountered before so large a work could be commenced under private management; but all was at length arranged; and, in the autumn of 1857, Messrs. Lucas, general contractors for the building, and Mr. H. Grissell, contractor for the iron-work, were enabled to begin their operations.

Before describing in detail the construction of the several parts of the new building, it may be useful to glance at the general principles which guided its arrangement, and in some measure determined its design. After so dire a calamity as that which had just befallen its predecessor, it was but natural that it should be sought to render such a catastrophe less likely to recur. It was consequently determined to carry out a system of fireproof construction wherever practicable; and though perhaps it is hardly possible at present to render a theatre actually fireproof, the new building was intended to be an advance in that direction. The Building Act most properly requires all corridors and staircases in such structures to be of incombustible materials, and these requirements had of course to be observed. In addition, as it had been noticed in previous cases of fire that the roof served as an easy means of connection between the stage and the auditory, it was sought to avoid this source of danger by making the roof and its covering entirely fireproof; and it was decided to use wood as little as possible in the construction of the interior. Regarding the danger of staircases with open well-holes in public places (which has since received a lamentable illustration in the case of the Polytechnic), all staircases used by the public were arranged to consist of solid stone steps, built into a wall at each end. There were to be no windows, and the well-holes were to be filled up by walls carried up from the bottom, after the custom so common in Italy, and which, from its advantages to the stability of the edifice, as well as to the safety of its occupants, appears to be well deserving the attention of architects who have to provide for the reception of large crowds of persons liable to sudden panics. The shape of the auditory was a matter of much consideration, the faults of a horse-shoe shape being obvious as regards the position of the side-boxes. Plans, more or less approaching to a circle or ellipse, were tried and laid aside, and different schemes of arrangement canvassed. The result was, that the horseshoe form was at length resolved on, notwithstanding the disadvantages above alluded to. The requirements of a London theatre for the Italian opera are very peculiar, and differ in many ways from those of ordinary play-houses. As regards the latter, the great desideratum is of course that all the visitors may see and hear to the greatest possible advantage; and so that this be achieved, the relative position of the audience to each other is of comparatively small consequence. In an opera-house, though similar objects are sought to be attained, there are other circumstances to be considered, which in some measure counterbalance them. Thus, the royal box being on the grand tier, the latter is the great resort of fashion; and inasmuch as the rent of the boxes on the grand tier bears about the same proportion to the tier above that a drawing-room floor does to a second floor, it is obviously a great desideratum to obtain as many boxes as possible in this level, where it is found that even the side boxes (in spite of drawbacks of position), are always eagerly sought for. The system of separate boxes likewise prevents the possibility of gaining accommodation by deepening the dress-circle, so as to get several rows of seats. For these and other reasons it was considered that assuming the dimensions of the Proscenium to be fixed at 50 feet as the maximum admitting of convenient working, a horseshoe, more or less elongated, was the fittest form in this particular case, although it might possibly be modified with advantage in other structures with less peculiar requirements. The alleged acoustical advantages of a horseshoe plan were likewise supposed to have some weight, and certainly her Majesty's Theatre is an encouragement to any architect to adopt that figure, as it is unquestionably most successful in this respect. In order to illustrate the differences of shape, I have had prepared a plan of her Majesty's Theatre to the same scale as the other places before alluded to. It will be perceived that in the old theatres the Royal box was on the left-hand side of the auditory, and that in the new house it is placed on the opposite side. It will readily be seen that as regards Covent-garden, facility of access from Hart-street governed this arrangement, which, as it involved a departure from time-honoured precedent, was submitted to her Majesty for approval, before the building was commenced. Another peculiarity of plan in the new theatre may here be noticed as regards the crush-room or saloon. This is situated at the top of the grand staircase, and forms an anteroom, through which all must pass on their way to the boxes. The refreshments are placed at the farther end of the room instead of being in a separate saloon, inaccessible to ladies. The object sought by this arrangement was by rendering a passage through the crush-room imperative to all, to cause it to be forbidden to none, and the result has fully answered the expectation, inasmuch as all classes of spectators may now be seen to resort to this apartment for refreshment between the acts, or during the performances.

It may be observed, on examining the plan, that, owing to the shape of the site, the building is not rectangular, the corners in Bow-street being respectively obtuse and acute. By constructing the principal entrance from the crush-room not in accordance with the centre line of the auditory, facilities are obtained for the formation of a grand state-box in the centre of the house, on special and extraordinary occasions, by taking in the boxes on either side and the corridor in the rear. The iron beams over the centre boxes are fixed with bolts and nuts, instead of rivets, to allow of their removal on such occasions, so as to give to the state-box the additional height which its importance would demand. Entrance to the state-box would probably be obtained by the grand entrance for the royal party and suite, and the public could be admitted from the Floral Hall, from Hart-street, and through her Majesty's ordinary private entrance. It will not escape observation, on comparing the plan of the new theatre with that of its predecessor, that although the dimensions both of stage and auditory are larger in the former case than in the latter, the size of the whole building is less at present than was the case formerly. This reduction of size was caused by the determination to devote the southern portion of the site to the erection of a building of iron and glass, to be called the Floral Hall. Inasmuch, however, as a large stage and auditory necessarily require adjuncts of appropriate capacity, it became obvious that the only way to make up for deficiency of area was to increase the height. There are eight stories of rooms on either side of the main building, and in these are placed the green-room, the dressing-rooms, the lavatories, wardrobes, armories, music-rooms, private sitting-rooms, and the numerous other apartments necessary for the working of a large lyrical establishment. In addition to the space obtained by the above arrangement, it was considered that important structural advantages were gained by carrying up the side-buildings to the same level as the principal walls, instead of having the latter isolated for their upper portion, as is the more common arrangement. Regard being had to the well-known strength of hollow columns, it was thought that the arrangement adopted of two longitudinal walls, 11 feet from each other, and connected together by frequent cross walls, would possess all the advantages of a series of rectangular columns or piers, if the tenacity and cohesion of their parts could be effectually secured. In good brickwork, when perfectly set, this would necessarily result; but as, in the case under notice, the building required to be occupied before the mortar was dry, and the roof and other great weights would come upon the green walls almost before the bricklayers' scaffold could be removed, it was determined, as a temporary measure, to assist their cohesion by iron ties passing through the cross walls and connecting together the two main longitudinal walls. These were inserted about every 12 feet in height, and were each composed of 2-inch square rods, placed 9 inches from each other, so as to avoid the flues, and secured at the ends, by screws and nuts, to strong iron plates. These ties have now served their purpose, and, the walls being thoroughly dry and the mortar set, are independent of extraneous assistance. The arrangement and design of the roof called for some consideration. It is customary to place the carpenter's and other shops in this portion of the building, and the ordinary plan is to construct the roof with queen-truss principals, so as to get as much accommodation as possible between the queen-posts. The truss used by Sir Robert Smirke was of this description, and deserves the most attentive study as a piece of careful and excellent carpentry. From what has been said as to the comparatively small area covered by the new theatre, the importance will easily be seen of gaining as much accommodation as possible in the roof, and it soon appeared that a system of beams passing from wall to wall, with small roofs between, offered peculiar advantages as regards space, when compared with the limited area allowed by the queen-truss arrangement. The iron beams supporting the roof are 96 feet long and 9 feet deep, and the credit of their design is due to Mr. Henry Grissell, who undertook to make, fix, and guarantee them. This he successfully accomplished in an extremely short time; and it is to me a pleasure as well as a duty

to acknowledge the obligations I am under to him, as well as to Messrs. Lucas and the other contractors, for the ready help and co-operation they have at all times been willing to afford.

As may be perceived from the drawing, the beams are of the description known as trellis, in eleven compartments. The flanges are composed of a combination of angle iron, wrought-iron plates, and a section which may be called double L iron. The diagonals in compression are composed of double angle bars, each 6 inches by 3 inches, and the diagonals in tension are formed of double flat bars, varying from 7 inches by ½ inch to 7 inches by ¼ inch. It was considered that the open-box form of the upper and lower flanges would give a considerable amount of lateral stiffness to the girders, and that by the adoption of the trellis form, a lighter and more convenient girder could be obtained than by using one with a solid web-plate. The necessity before alluded to of using the roof as workshops determined the depth of the girders, which it was found could not be less than 9 feet, without causing inconvenience to the workmen; and the facilities of passing through the girders, wherever necessary, was also thought a desideratum. The accessibility of the various parts of the girder to the painter's brush was also obtained,—a great point where wrought iron is used, and the importance of which, considering the great tendency of this material to rust, is, perhaps, hardly always sufficiently recognized by us in practice.

There are eight main-roof girders, 21 feet apart, and on the top of each is a cast-iron gutter 16 inches wide: wrought-iron principals of the usual character, and 21 feet span, connect the girders together and support longitudinal purlins of T-iron, and the whole is covered with slab slate half an inch thick, with laps and fillets constructed in the ordinary manner. The workshops are lighted by skylights in the apex of the roofs, all of which, with the exception of the necessary woodwork of the skylights, are thus of an incombustible character. The girders occupying the whole side of the workshops, it became necessary to consider how large pieces of framing made in the shops could be lowered to the stage, as the interstices between the vertical struts and diagonals of the girder could only allow pieces of small size to pass through them. The object was sought to be attained by fixing the girder immediately over the proscenium, its own depth lower than the others. Advantage was taken of the necessity for a sound-reflector at this portion of the ceiling to effect this, and the top of the girder over the proscenium is level with the workshop floor. On the top of this girder two cast-iron stancheons are fixed carrying intermediate girders and the roof, and three spaces 25 feet, 40 feet, and 25 feet wide, are thus left open to allow of the passage of bulky articles. The girder at the stage end of the building is 30 feet from the wall, and the space between is covered by a lean-to roof, also of cast-iron, with a large skylight over the painting-room. A lean-to roof was here adopted from its giving the maximum of height to the wall on which the painting-frames hung, and from its readily allowing abundance of light to fall at the proper angle on the same. There are no floors between those girders which are over the stage, and the scenes can therefore be raised as high as the tie-beams of the 21-feet span roofs. The weight upon the girders is, as may be supposed, very large; and the mode in which it was calculated may be seen by the table exhibited, which shows a weight of 150 tons to be provided for as regards each girder. Before any were fixed, the completion of two was hurried on at Mr. Grissell's works, and when finished they were placed side by side on his wharf and loaded with 300 tons. Special foundations were formed of concrete, and the girders placed about 9 feet apart on balks of timber resting upon brickwork and concrete. Cross pieces of iron were introduced between the girders to act as stays or braces, and to serve the office rendered in execution by the transverse roof principals and floor beams. The preparations being completed, pig-iron to the amount of 300 tons was heaped upon the girders, an occupation which consumed several days. The girders were constructed with a camber of 2½ inches, and, when the weight was on, a deflection of 1¼ inch was observed. On the removal of the weight a permanent set was found of ⅜ inch in one girder and ¼ inch in the other; a result probably attributable to all the parts having been brought to their bearings. It had been my intention to have allowed the weight to remain upon the girders for ten days, but after it had been on for twenty-four hours signs of weakness appeared in the wharf wall immediately adjoining; and it was found that unless this was quickly relieved, girders, foundations, and wall bid fair to find a resting-place in the Regent's canal. The pig-iron was therefore removed in all haste, but the result of the proof was considered so satisfactory, that the whole of the other girders were constructed like the two first, without any alteration. During the week before last I again tested one of the roof girders, to ascertain whether two years of work had produced any effect. I found the camber reduced to 1⅛, showing a set, consequently, of ⅛ of an inch.

Having now described the construction of the roof, and leaving the mode of fixing it to be explained presently, it may be as well to point out some peculiarities of construction resulting from the determination to render the theatre available for other purposes than those of the Italian opera.

The arrangement of the theatre for the latter is so peculiar, owing to the special requirements before alluded to, that it is not suitable for other performances without considerable modifications. In rebuilding the Opera-house, however, Mr. Gye resolved that it should not be erected with a view to one destination only, and it therefore became necessary to consider how his wishes could best be carried out. The boxes being entirely supported by iron beams, cantilevers, and columns, the divisions between them are formed of 1½-inch wood framing, and are all moveable. The backs of the boxes are likewise capable of being removed, so that a portion or the whole of the corridor may be taken into the boxes, if required, to form an extended dress-circle. On the pit tier, the boxes, with the floors, fronts, sides, and backs, can be entirely taken away, giving facilities thereby for forming a very capacious pit, extending under the dress-circle to the semicircular wall at the back of the corridors. The entrances to the theatre are so arranged that they are suitable for this arrangement of the auditory without modification; and the whole of the pit floor is so constructed that it can be raised or lowered at pleasure in a few hours. I hope I have not trespassed unduly in thus detailing the various considerations which to so great an extent have determined the design of the work, but I have felt that to render intelligible the reasons for such arrangements as are obviously peculiar, rather more than a mere description of them was required.*

PROVINCIAL NEWS.

Hoddesdon (Herts).—It is proposed to erect here, by shares, a new Town-hall, on the site of the present clock-tower. Increased population, and improvements in the town, render a public building of the kind necessary.

Chevening.—The new National School lately erected at Chipstead, in the parish of Chevening, has been opened. The school is in the Gothic style, and is 54 feet in length, 20 feet in breadth, and 39 feet to the ridge of the roof, which is of stained deal. The school has been erected by private subscriptions from landowners and others in the parish, the principal subscribers being the Earl Stanhope, F. Perkins, esq., Earl Amherst, and the rector.

Bristol.—The probable expense of the proposed new workhouse for Bristol, varying from 16,000*l.* to 24,000*l.*, has somewhat alarmed the ratepayers; and a discussion is going on in the local papers as to it.

Newcastle-upon-Tyne.—Workmen, says the local *Courant*, have commenced to level the ground for the foundations of the approaches to the High-level Bridge, and the open space at the head of the Side has already been boarded off.

Jedburgh.—The movement for the erection of a corn exchange at Jedburgh progresses favourably, upwards of 2,100*l.* having been already subscribed towards the object in view.

ARCHITECTURAL PHOTOGRAPHIC ASSOCIATION.

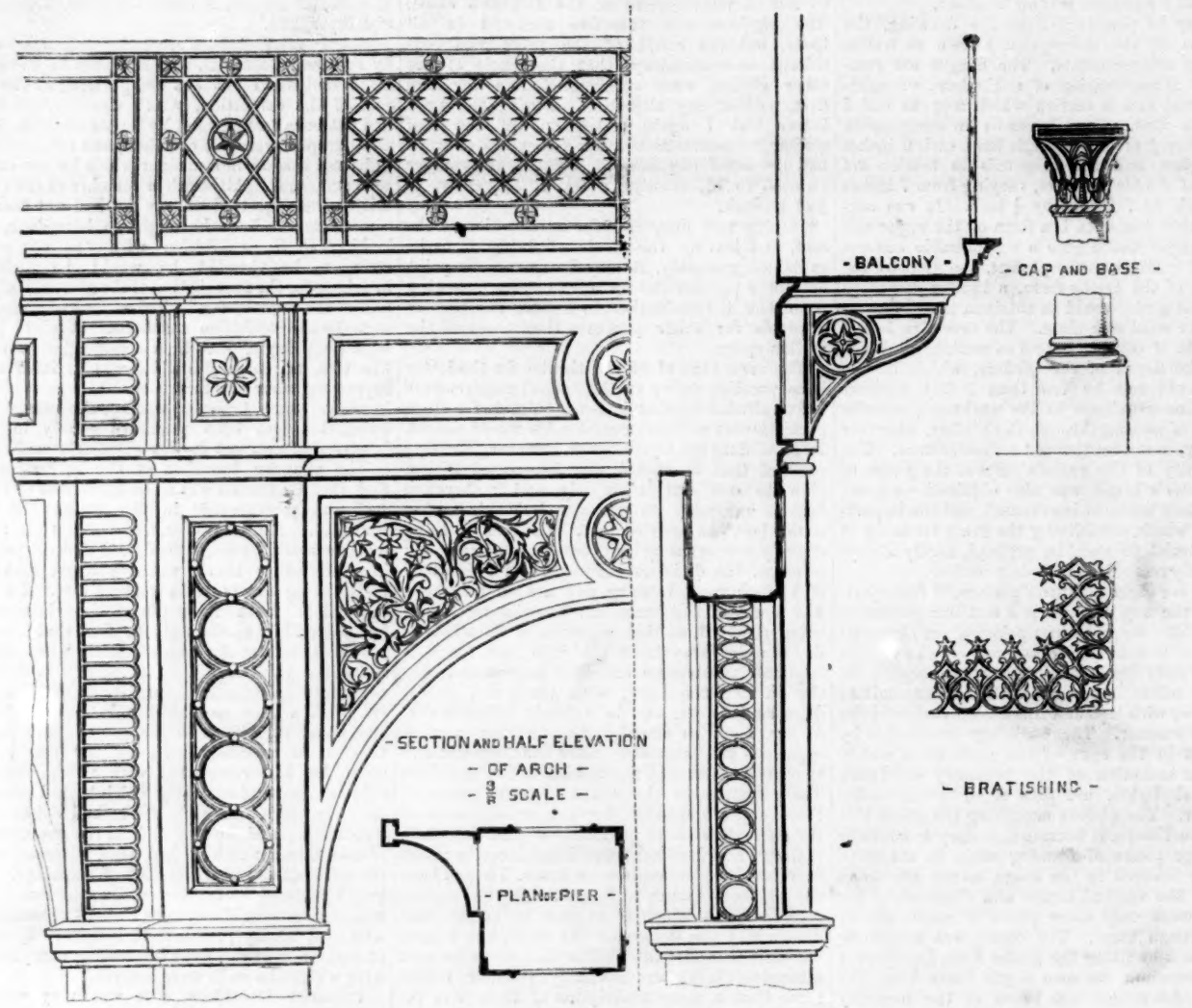
THE third annual exhibition of this Association was inaugurated on Wednesday evening last, at 9, Conduit-street, by a meeting of the subscribers and their friends. The photographs, of which there are 510 in all, are thus classified: — France (by Baldus Bissot, Cundall & Downes), 77; the Netherlands, Germany, and Switzerland, 8; Constantinople (Robertson & Beato), 11; Jerusalem and the neighbourhood (Robertson & Beato), 24; Roman States (Macpherson), 30; Northern Italy (Ponti), 110; Spain (Clifford), 26; England (Fenton, Cade, Melhuish, Greenish, Cocke, Cundall & Downes, Dolomore, Bullock, Bedford, Robinson, and Piper, 224.

Shortly after eight o'clock the chair was taken by Professor Cockerell, who said that he was sure all present could not but feel gratified at the result of the exhibition, which was the best that had yet been inaugurated by the Association. The photographs were all excellent, and reflected the light and shadow in a manner which he had never seen surpassed. Although a member of the committee, he regretted to say he had not exerted himself as much as he ought to have done, but looking at the exhibition with the eye of a stranger, he thought he would be justified in asking for the approbation of the meeting on behalf of the committee who had worked so zealously to make the exhibition a success. It might perhaps be thought that in a commercial country like this, an enterprise which was in itself self-supporting must also have some commercial object in view. Such, however, was not the case. The association had been promoted purely in the interests of art, and it was extremely creditable to the younger branches of the profession to find that its success was to be attributed to their zeal and perseverance in the pursuit of the beautiful. He was therefore sure that their motives would be understood, and that the public, in appreciating them, would perceive that the undertaking was purely a work of love. He was induced to make these observations because it had pained him exceedingly to find that some of his colleagues on the committee had been treated more like tradesmen than as persons who were anxious to develope an instructive and fascinating art, with a view to obtain a better knowledge and wider experience in the profession of which they were members. In looking round the room he had recognized with much pleasure objects of art and antiquity which he had not seen for forty years. In early life he had visited Constantinople, and he now beheld the photographs of monuments which he had then witnessed with the enthusiasm and admiration of a student. He would not trespass further on the attention of the meeting, but would call upon Professor Donaldson, who had kindly promised to illustrate by some remarks a portion of the interesting sun pictures with which the walls were covered.

Professor Donaldson, who was very warmly received, then proceeded to make some observations upon the progress of the photographic art, and its application to many of the most interesting monuments of Rome, Venice, Spain, and other continental States. The learned gentleman commenced by observing, that in the year 1840, when happening to be in Paris, he had the privilege of making the acquaintance of M. Daguerre, the discoverer of the process subsequently known as the daguerreotype. He repaired, by invitation, at six in the morning, in company with a friend, to the modest dwelling of the artist, who received him with the courtesy and attention for which he was so much distinguished. M. Daguerre described the whole of his process, and expatiated on the development which his discovery would have upon future art productions. He was then in the enjoyment of a pension of 240*l.* per annum; but had he survived to see the results to which his discovery had been carried, he might, indeed, have regarded them with feelings of no ordinary exultation. Although our own countryman, Mr. Talbot, arrived about the same time at results similar to those achieved by M. Daguerre, it should be remembered that the latter was the first person to seize, as it were, the passing image, to stamp it with the fidelity of nature, and to give to the world an invention, the utility of which was so widely recognized that there was not now a single village in the empire which did not contain the means of photographing portraits, objects, and places. The value of photography to the architect was incalculable, and he (Professor Donaldson), when travelling in Asia-Minor, had often turned some miles out of his route to inspect some ancient monument, the image of which he had neither time nor opportunity to sketch. A photographing apparatus under such circumstances would have been a treasure which an architect and a lover of the picturesque could alone sufficiently appreciate. Professor Donaldson then proceeded to refer to the photographs of Rome by Messrs. M'Pherson & Anderson, which included views of the Coliseum, the Theatre of Marcellus from the Piazza Montanara, the Forum of Trajan, the Temple of Clitumnus, the Arch of Constantine, the Julian Basilica and Tabularium, the column of Phocas,

* To be continued. Numerous illustrations of the theatre will be found in our previous volumes.

FLORAL HALL, COVENT GARDEN.



and other famous monuments of what was once the mistress of the world, and the metropolis of the proudest and most powerful nation of the earth. The ruins of these structures still bore testimony to the mind and taste of the Roman people, who had endeavoured to impress on their architecture the religion, state, laws, commerce, nationality, and common purposes of life. Having pointed out the principal features of interest in the architecture of ancient Rome, and glanced at the historical associations connected with them, Professor Donaldson directed attention to the series of photographs representing Venetia, including the Church of St. Mark, the Church of Santo Stefano, the Grimani Palace, and many other public and private buildings, in which the architect had laboured to produce grand and striking effects. He remarked that the unbounded expenditure of the three centuries, known in history as the Mediæval Period, furnished many striking illustrations of the piety and munificence of our forefathers. At that time there were no compulsory enactments for the building or repair of churches. The voluntary principle was the only one acknowledged, and many were the cases in which the poor Franciscan or Dominican friar had devoted many years of his unostentatious life to collecting, at the castle of the noble and the cottage of the peasant, those free-will offerings by the aid of which so many of the magnificent cathedrals of the twelfth and thirteenth centuries were erected to the glory of God and the service of His Church. It would be idle to dilate upon the advantages which photography would have given in past ages, but to the student of art in the present day, it was an unfailing source of interest and instruction. Among the collection now exhibited were some magnificent views in Spain from the camera of Mr. Clifford, one of the most accomplished masters of this delightful art. They included the ruins of the celebrated Roman aqueduct at Merida, the ruins of the Roman theatre, the Roman bridge at Alcantara, the monastery at Placencia, and all that remained of that fantastic and captivating building, which the Moors constructed on the retirement of their Roman conquerors, and which had been so wonderfully reproduced at the Crystal Palace,—the Alhambra. Professor Donaldson concluded a very interesting lecture, which repeatedly evoked the plaudits of a numerous auditory (including many ladies), by announcing that, on a future evening, other speakers would direct attention to the views in France, Constantinople, and Jerusalem, reference to which would exceed the limits of a single paper.

At the conclusion,

The Chairman observed, that he was sure he but spoke the sentiments of all present, when he begged, in their names, to thank Professor Donaldson for the able, erudite, and instructive paper which he had just read.

A vote of thanks having been accorded unanimously,

Mr. Mair moved a similar compliment to the chairman, which having been acknowledged by Professor Cockerell, the proceedings terminated.

The exhibition will remain open daily from the 9th of February to the 10th of March (inclusive), from nine o'clock till six; and on Tuesday evenings from seven till ten. We shall speak of it again next week.

THE FLORAL HALL, COVENT GARDEN.

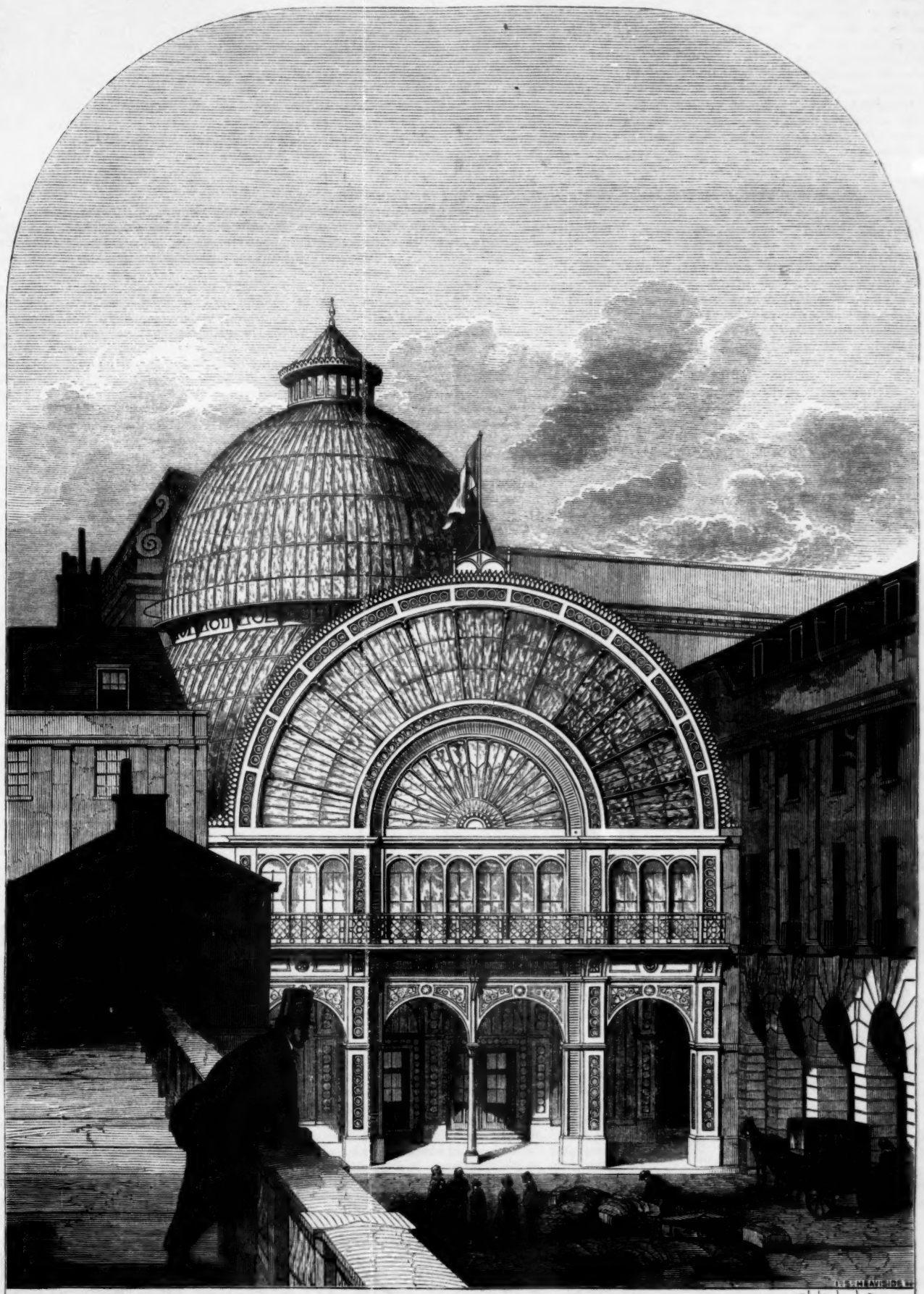
This building, which is now nearly completed, was described by us at length on a former occasion: we now give a view of one of the principal entrances, that in the "Market," with some details of the iron front, and a block plan to explain the position and shape of the edifice, which is 220 feet long and 75 feet wide. Our readers will remember that the Floral Hall adjoins the new opera-house, and communicates with it. It resembles on plan the letter L, and is covered with a semicircular roof of iron and glass. A dome of 50 feet span, with pendentives, rises above the two roofs at their intersection, and forms a prominent object in the view. The public footway of the Piazza is continued under the end of the short arm of the building; and a gallery, with a separate staircase, has been constructed over the footway. The whole of the fronts towards Bow-street and the Piazza are of iron and glass; and, indeed, the entire building may be said to be constructed of these materials, brickwork forming a very small portion of the superstructure. The dome and roofs are principally of wrought iron, and the columns, arches, and piers, are of cast iron. There is a basement story extending under the whole of the buildings, 17 feet 6 inches high, available for vaults or stores. The works are now being rapidly pushed forward, and the building will be ready for opening in a few weeks. Mr. E. M. Barry is the architect. The contractors are the same who carried out the new Opera-house, namely, Messrs. Lucas, Brothers, for general matters; and Mr. H. Grissell, for the iron and glass works.

Stalls will be let to various tenants for the sale of plants, shrubs, flowers, seeds, &c.: others will be dedicated to the sale of ornamental glass, flower-vases, terra-cotta flower-pots, flower-baskets, syringes and watering apparatus, garden tools, and, in fact, all articles appertaining to the garden.

In the *Builder* of December 15, 1855,* it will be seen that Mr. Gye proposed the erection of a glass flower-market as long as eighteen years since, in connection with his gigantic glass arcade scheme. As far as the flower-market is concerned, he has now realized his project, and adorned the neighbourhood.

Industrial and Fine-Art Exhibition at Portsmouth. — The Portsmouth and Portsea Athenæum Exhibition of Industrial and Fine Art has been opened with a good display of valuable and useful objects of science and art, in the lecture-hall and other apartments of the Athenæum, in Bishop-street, Portsea.

* See page 603, vol. xiii.



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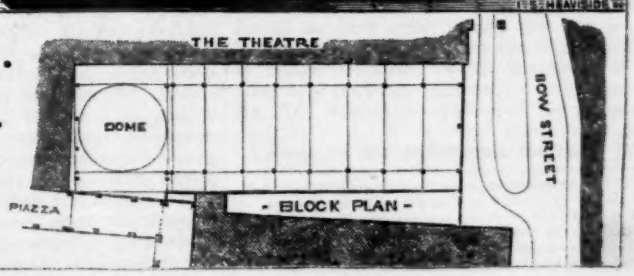

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE ordinary general meeting was held on Monday evening last, at the house in Conduit-street, Hanover-square, Mr. Hussey, V.P., in the chair.

Certain donations were announced, amongst them some portraits of eminent architects, including that of Sir Christopher Wren, and others of ancient date.

Thanks were voted to the several donors, and it was proposed that special thanks should be voted to Mr. C. C. Nelson (hon. secretary) for framing these portraits, which the Institute had possessed some time.

The Chairman said Mr. Nelson was deserving of the thanks of the Institute not only for what he had done on that occasion, but for the services he had performed ever since he had been connected with the Institute.

Professor Donaldson then rose to explain a piece of mosaic work which he had brought from Venice, and which he had caused to be placed in the room for the inspection of the members. This piece of mosaic came from an old church, where the mosaics were in a most dilapidated condition. Some time ago a person was employed to repair the mosaics, but it appeared that his mode of operation was to take away the old mosaics in order to be paid for replacing them by new ones. The present piece, which was a head of St. Peter, and was of the eleventh century, he (Professor Donaldson) purchased in a shop near the Basilica San Marco, where it had been lying some time. The church was on one of the outlying islands of the Lagunes, and was almost deserted. Indeed, the churches in Venice itself were becoming very dilapidated.

Mr. E. M. Barry then read a paper on the building of the Royal Italian Opera House, Covent-garden, which we give elsewhere (see page 85).

Professor Donaldson said it was with very great pleasure that he rose to express the great satisfaction with which he had heard the lucid statement of Mr. Barry upon this very difficult and complex subject. Mr. Barry had proved himself entirely master of it, and he thought that, although doubtless most of those present on entering the room believed that it was a most difficult thing to construct a theatre, yet they would all leave it with the impression that it was a very easy matter. The remarkable modesty of Mr. Barry, and the generous tribute he had paid to the talent of those who were associated with him in this work, did not at all diminish his merits. This was no common work. There were so many contingencies to provide for, and so many contradictory elements to reconcile, that it must be a matter of great congratulation to Mr. Barry that he had succeeded in erecting such a work with such distinguished ability and success. He (Professor Donaldson) had visited the works, and he was struck with the skilful arrangement of what he would call the skeleton of the building. All the parts were admirably arranged to meet the pressure that might be brought upon them. Every precaution was taken not only to provide against any settlement on the columns, but for any settlement of the columns themselves. The arrangement of the staircases was also very satisfactory, and was admirably adapted to meet any sudden panic arising from fire or other causes. In fact, the whole arrangements were carried out with very considerable skill; and when he was upon the roof he saw in the vast combinations forming it a very imposing mass of construction, which carried with it a sense of solidity extremely satisfactory. Mr. Barry had in all parts explained himself so thoroughly and clearly that there was hardly an observation to make upon it or question to suggest. He had anticipated everything upon which any observation might have been made. It was therefore with great pleasure that he proposed a vote of thanks to Mr. Barry.

In reply to an inquiry,

Mr. Barry said the cost of the theatre was something under 80,000*l.*; and relative to the fibrous slab and the material made by Desachy, he said, as far as he knew, they had answered very well indeed. The fibrous slab had shrunk a little since it was fixed, as almost anything would placed over the chandelier. As to the other, of course, he added, I cannot say as yet, but as regards its lightness and convenience for fixing, I think it can hardly be surpassed.

Professor Donaldson said he was going to make some observations upon that. He had visited the theatre of San Carlo, at Naples, and a very ugly building it was. It was short as compared with its width, and the audience could hardly hear the music in it. It seemed as though it had been constructed haphazard as to whether the audience could hear well or ill. La Scala, at Milan, was of a very different character. It was as pretty a theatre as any in all Europe, and the hearing was perfect. The width of the proscenium was 43 feet, and the width between the boxes was 66 feet. The length from the curtain to the centre of the boxes was 88 feet; and the theatre was a very graceful one indeed. Mr. Barry had followed that plan. He had given 50 feet to the proscenium, and 80 feet as the depth—about the same proportion as La Scala. The theatre at Bologna was by a master-mind—Viviano was his name: he had built many theatres in Italy. He (Professor Donaldson) recollected being struck by the painting. It was white and gold, and the manner in which the two were arranged was very pleasing, the quantity of white and gold being proportioned in the most elegant manner. In other theatres they found an immense quantity of colouring introduced without harmony, but those at Bologna were blended in a simple way, and with elegant effect.

Mr. Jennings said,—In the description of this building, it appeared that there were cast-iron gutters used of greater length than in any other building, I believe, in London. Are they one continuous gutter the whole length, to allow at each end for contraction or expansion; or is it not found necessary to make allowance under such circumstances?

Mr. Barry.—They are in one length, 96 feet, bolted together.

Mr. Jennings wished to know if any portion of the under side of the ceilings was painted—the ceiling of the corridor. Why he mentioned the subject was that it very frequently happened that after the architect left the work the painter came in and painted these places, the absorption was done away with, and the architect suffered.

Mr. I'Anson said that Mr. Barry had read a highly practical paper. It was common for them to hear papers of an æsthetic character, but that evening they had had their attention drawn to the solid and more useful part of the profession. It was not often that they had the opportunity of hearing a description of this importance by the construction of a building of this magnitude. He heartily concurred in, and he begged leave to second, the vote of thanks to Mr. Barry.

Mr. Kerr wished to be allowed to ask Mr. Barry to explain the table of strain in the wrought-iron girders. It was a very interesting thing, and they might seek to understand a little more in detail of what was represented, no doubt, perfectly well upon that table. At the same time he would be glad to ask Mr. Barry to explain the precise principle involved in the connection of these great girders in two pieces; that was to say, in the middle. He must say that, during Mr. Barry's description of these marvellous works, his attention was particularly directed to these girders, and it struck him that perhaps some scientific principle might be involved in the arrangement adopted of hoisting these two, and joining them in the middle. It had struck him that there would be weakness in joining them in the middle, as the middle was the weakest point, and it was desirable to avoid any additional weakness. At the same time it must be seen, that to have joined them in three would have made a double chance of weakness at those points. Perhaps the occurrence of any weakness was effectually provided against in the mode in which the beams were connected. He would add his humble testimony to the very great pleasure the Institute had received from the paper read by Mr. Barry, and he hoped that it would be the first of a long series.

Mr. Barry said he was afraid he could only give a somewhat general answer. The amount of strain was six tons to an inch; and as far as regarded the details of the different parts, Mr. Grissell, if he had been there, would have explained them better than he could.

Mr. Baker said there was one other point of interest, and that was with regard to the brickwork. The brickwork was carried up remarkably quickly, and to a great height. Mr. Barry had had now some experience of it, and perhaps he could tell them what had been the effect on the brickwork. About five years ago, he (Mr. Baker) carried up a wall about 30 feet high, and at the same season of the year, about November. The brickwork had been taken down this season, and it proved to be perfectly sound, and the mortar was as hard or harder than the bricks, and in many cases there was very great difficulty in taking down the wall. He would be glad to hear what had been the effect on the brickwork in this case.

Mr. Barry said he was not aware that any effect had taken place since the house was opened, but, no doubt, while it was going on, a settlement was of course to be looked for. In order to observe how that went on, he had small rods made of an inch and a half square, and fastened end to end in the wall, as the wall went up: and as it settled, he could observe whether there was any undue settlement. After the roof was on, he had all these rods taken out and shortened, and from that time he had found no further result, and so he had them all taken away. He was not aware of any settlement of any kind since the building was opened.

The vote of thanks was then unanimously passed, and the meeting adjourned.*

GLASGOW ARCHÆOLOGICAL SOCIETY.

THE usual monthly meeting of this society was held on the 6th inst., Mr. Sheriff Strathern, presiding. Dr. Scoular read a paper on the "Remains of certain circular Buildings at St. Blane's, in Bute." From the character of these ruins, and various notices of St. Chattan and St. Blane, or Blaan, gathered from Colgan and other sources, he had arrived at the conclusion that these were the remains of ecclesiastical buildings erected some years before Columba settled on Iona. Mr. Honeyman, hon. sec., read "A Description of the Church of Kilchousland, near Campbeltown." He was of opinion that the original building, measuring 32 feet by 15 feet 6 inches inside, was erected towards the commencement of the tenth century; that the chancel, measuring 16 feet 6 inches square, had been added during the thirteenth century; and that a great part of the east and south walls had been re-erected during the sixteenth century, or probably even at a later period.

BRITISH INSTITUTION.

ALTHOUGH the walls, on entering, have a pleasant-enough aspect, and present some pretty pictures, there are wonderfully few works of mark and likelihood in the present exhibition. It consists of 632 paintings and 17 pieces of sculpture. No. 3, "Joy," by T. F. Dicksee, is a well-painted young head, to pair with "Sorrow" (25). The same artist, who is strong this year, exhibits a more elaborate work, entitled "A Labour of Love" (385). No. 33, "The King's Artillery at Marston Moor," by John Gilbert, though full of movement, and not without interest, is so carelessly painted, as scarcely to come under the denomination of a picture. Two other works testify to Mr. Gilbert's industry and fecundity. Mr. Jutsum is less successful than useful in (53) "Norbury,"—a bit of Mr. Thomas Grissell's beautiful place: the reflections are disagreeably green. No. 62, "Nottingham," by H. Dawson, is the most satisfactory landscape in the room: the sky is a study; the more noticeable because some of our *photographic* painters ignore the feature. Ansdell's "Spanish Flower-seller" sadly wants life. (81), "The Nile," by F. Dillon; (91), "Swaledale, Yorkshire," by E. J. Niemann; (141), "A Quiet Evening on the Thames," by W. W. Gosling; (180), "The Decline of a Summer-day," C. Leslie; (376), "Westminster Palace, from the Thames," J. Danby; and (603), "Under the Pine-trees at Castel Lusano," F. Lee Bridell, are amongst the best landscapes, and have, each, good qualities. Miss Stannard is admirable in "Fruit painted from Nature" (99), and Lance as good as ever, which is saying a great deal, in (115), "Black Grapes," and (193), "Before the Masquerade," the title of the latter, however, is a puzzle. In "The Dawning of Genius" (119), Joseph Clark,—a quietly-painted picture, with much expression,—an incipient artist is sketching a dog held by a mischievous girl. "Fondly Gazing" (135), G. Smith, a mother watching the cradle of her little one—

"With anxious thoughts of future years,"—

is an admirable and beautiful work. No one quite disregards the opinion of any living being, and so the poor artist behind the door in Mr. T. P. Hall's picture, "Criticism" (249), is by no means indifferent to the comments of the servants of the house gathered before his easel. If Mr. Hall wants our opinion of *his* picture he shall have it: it is very nearly very good. "Antwerp in the Seventeenth Century" (293),

* A special general meeting of the members will be held on Monday evening, the 13th of February, to take into consideration the recommendation of the council with respect to the award of the Royal Medal, the Medals, and other prizes of the Institute for the year 1859; and their recommendation with reference to the Medals for the year 1860.

Hendrik Schaefels, is a richly-coloured and well-grouped picture, wanting mainly in the faces. If all these were as good as those of the old innkeeper and his wife, there would be no occasion to qualify the praise. H. Weigall has some well-painted heads. L. Haghe's light shines less brilliantly in oil than water, though "The Interior of the Church of St. Miniato, Florence," (177), a candle-light effect, will have many admirers. "Fishing Boats, Venice," by V. de Fleury (90); "The Petitioner" (157), W. J. Montaigne; "Shadows" (195), E. C. Barnes; "Pyefinch's Nest" (278), W. H. Ward; "Scene from Auld Robin Gray" (340), J. Craig; "A Welsh Drinking-Fountain" (362), W. S. P. Henderson; "The Fairy's Barque" (431), J. A. Fitzgerald; "Flowers" (502), St. Jean (price *only* 420*l.*); and a dozen other agreeable works may be pointed to.

AGAR FIELDS, ST. PANCRAS.

IN years gone by we placed fully in the light the miserable condition of the huts and dens in Agar-town,—huts undrained, ill ventilated, unwholesome, and demoralizing. Changes and removals have taken place since then, and some improvements have been made. The place still, however, calls for supervision. The condition of the Agar Fields, or Pancras Fields, is terrible. The whole space is covered with large and small pools of water; in fact, forming an extensive bog, very dangerous to the public health. The roads across the fields are impassable from deep mud, although there is considerable traffic to and from Camden New Town. Dead dogs and cats are thrown into the pools; and, with the refuse from the houses in Durham-street, in summer the stench is terrible. On the opposite side of the King's-road to Cook's-terrace, close by the turnpike, is a very old and dangerously rotten piece of footway, very dark at night, and impassable from water-pools in wet weather. The arrangement of the King's-road and the gullies is such, that in a heavy fall of rain stones and mud choke up the gullies, and often half the road is covered with water. We shall certainly have a return of the ague unless something be done by way of prevention. In fact, cases of ague have been by no means uncommon during the last few years in the metropolis, for which it has been difficult to account. Add to all that we have said, the stench derived from cat's-meat boilers and those factories of Belle Isle of which we have often spoken, and it may be imagined what a salubrious neighbourhood that of Camden New Town is.

LIVERPOOL BY-LAWS AND THE LIVERPOOL ARCHITECTURAL SOCIETY.

A SPECIAL meeting of the society was held on the 30th ult., to take into consideration the by-laws regulating the erection of buildings in the borough, proposed to the town council by the Health Committee. Mr. H. P. Horner occupied the chair.

Mr. John Hay, as one of the gentlemen signing the requisition for the holding of the meeting, said the matter was of interest to the whole profession, and he was really at a loss to conceive that any one could be indifferent to such additional power being granted to the officers of the borough as were proposed to be conferred upon them by the new by-laws. There was no doubt but that there was at present a staff of very able men in the capacity of surveyors; but at the same time there were many professional architects not one whit behind them in a knowledge of building operations, and he thought it would be a very hard case that the profession was to be disturbed by the borough engineer or his subordinates, in erecting a building upon any foundation which they, as professional architects, thought sufficient for the purpose. The responsibility of the architect was quite sufficient to make him careful to guard against any recklessness, because his professional character would be at stake. It was unfortunate that there was no proper recognition of the architectural profession, for at present there was no legal distinction between Sir Charles Barry and the lowest "jerry" builder. The powers which were proposed to be conferred by the by-laws were of such an extensive kind that they would be a very great grievance to every member of the profession. Mr. Hay referred more especially to the laws as to concrete foundations, and as to the restrictions in the use of iron for the support of superstructures. He urged that the latter clause had been framed in utter ignorance of the use of iron in substructures; and he had not the slightest hesitation in saying that he would undertake to put St. George's Hall upon a substructure of iron, and make it in every way as safe as it was at present.

Mr. Weightman objected to the laws *in toto*, on the ground that they were indefinite. There was no definition as to the meaning of "solid ground"—and who was to decide what was solid ground? There was likewise no definition of what was "sufficient concrete." He thought a schedule should be given referring to these standards, which in the present state of scientific knowledge could be easily fixed.

After a two hours' discussion, in which the chairman, Messrs. Barry, Alderman Bennett, and others expressed their dissatisfaction at the proposed reforms, and the great vagueness with which the laws had been drawn up, it was at last agreed, on the motion of Mr. Wylie, "That a respectful memorial be presented to the town council, at a meeting on Wednesday, asking them to postpone the passing of these by-laws for one month, in order to give architects and others sufficient time to consider them in their general bearing." There appeared to be only one dissentient from the resolution.

THE HARTLEY INSTITUTION COMPETITION, SOUTHAMPTON.

FORTY-FOUR designs for the proposed Hartley Institution were sent in by forty-two persons. According to the report upon them, made by Professor Donaldson, none of those which give the required accommodation and display sufficient artistic skill could be executed for the stipulated sum, 8,000*l.* The two which, in his opinion, meet most nearly the requirements are those marked respectively "Stella" and "Argonaut;" and he recommended, we believe, that the authors of these two designs should be communicated with, and invited to submit modified designs. A certain small number the referee put aside as so defective or inappropriate as to be beyond consideration, and he named twelve as the best in an artistic point of view.

The committee, if we are rightly informed, were to recommend to the council that a suggestion should be made to the designers, whose plans have been so far approved by Professor Donaldson, that they shall be at liberty to send in a guarantee in each case from competent practical persons who will undertake to carry out their designs for an amount not exceeding 8,000*l.*, according to approved specifications; and that no such guarantee shall be entertained unless it be accompanied by the names of two responsible persons, willing to be sureties for the performance of such contract. What course was actually taken by the council we do not yet know.

The great hall is required to accommodate 2,000 persons: the 8,000*l.* is not to include the expense of lighting and heating the institution.

BURNING OF FIREPROOF MILLS AT MANCHESTER.

IT is much to be desired, as we have often said, that fireproof premises were made fireproof in reality, or in some more complete and thorough way than they often are. A serious fire has just occurred at Manchester, in the Hanover Mills, which consisted of two adjoining portions, one new, and with fireproof floors and other arrangements against fire, but with a wooden roof: the other portion was old and not fireproof. The fire originated in the old part of the premises, which it soon converted into a ruin, and the fire caught the roof of the new premises, which it rapidly destroyed, together with everything in the upper floor. This, however, was by no means the whole of the mischief done to the new and fireproof premises. Great difficulty was experienced in preventing the fire from penetrating the partition wall. Although the iron doors intervening between the old premises and the new were very thick, the intense heat cracked them, the flames found their way through the shaft-holes in the masonry, the continuous shafting became red hot, and it was only by incessant vigilance that the new mill was saved from being on fire in every story. But all danger to the new mill was not even yet at an end. The wooden binders in the partition wall were all burnt away, leaving it full of holes and fissures, and the intense heat had warped it to such an extent that it became detached from the side walls of the new mill, and left the buttresses of the brick arches sustaining the floors at that end of the building without support. They consequently bulged outward, and it was found that two bays of arches were cracked. In the fourth story the cracks were slight, but they increased in width as they ascended to the top; and a few courses of brickwork had actually fallen from the seventh story into the sixth when the rent was discovered. The hopes that had been entertained that the new mill might soon be placed in a working condition again were soon dispelled by the unexpected fall of the two bays already mentioned. The side wall, towards Buxton-street, to the length of two windows from the old mill, came down with a fearful crash. The men who had been employed in the new mill had been ordered to withdraw about an hour before; but Mr. David Bellhouse, who, with two other gentlemen, had been examining the building, had withdrawn from it only a short time. The machinery in the part where the fall took place was totally destroyed. The damage from this cause alone will amount to several thousand pounds. It was feared that the whole of the new mill would fall. It is hoped, however, that the remaining arches will stand until supports can be placed against them; and, in that case, it is believed, there will be no necessity for pulling down the portion of the new mill at present standing.

Of the damage only a rough estimate can at present be made. It is probable, however, that it will amount to from 30,000*l.* to 40,000*l.* Insurances had been effected on the old mill and its contents to the extent of 24,000*l.*

GENERAL MEETING OF THE CENTRAL ASSOCIATION OF MASTER BUILDERS.

WITHDRAWAL OF THE "DECLARATION."

A GENERAL meeting of the Association was held at the Freemasons' Tavern, Great Queen-street, on Tuesday, the 7th, and was very numerously attended. On the motion of Mr. Lucas,

Mr. Thomas Piper took the chair, and stated the business of the day. He regretted that Mr. Lee, who had presided at the first meeting, was not there to take the chair again; but he, the chairman, might yet congratulate himself, that while, when Mr. Lee presided, the struggle was beginning, now he hoped it was brought to a close. I am sure, he continued, I speak the feelings of all present when I say the circumstances preceding our meeting in August were of such a character as to compel us to assume a position which was not only adverse to our best feelings, but to all our interests. At that time everything was against us. We were not only embarrassed by the nine-hours question, but by a whole host of smaller but most important questions, which were hampering us to an extent that rendered it impossible for us to conduct our business. It was painful and injurious to us to be placed in a position of antagonism to those associated with us in our common daily pursuits, whose faces we were accustomed to see from day to day, and with whom we had common interests. As the committee said in their report, we draw our resources from a common fund, and we are all embarked—the lowest working man and the highest employer—in the same enterprise and for the same objects. Had the movement which compelled us to form our central association confined itself to legitimate aims—to the quiet discussion of matters in difference—we should never have been placed in circumstances of apparent hostility to our workmen. But when they, who originated the movement, called out the men at work for a certain firm—when they took an illegal position and compelled working men to leave their employment—then the duty before us was clear; namely, to devise means by which, without resorting to any offensive movement, such as a "lock-out," we could make a bridge, as it were, by which those who were willing to join with us might come, and leave those who were leading them into error. That overture was not received with much affection, and it became eventually a subject of great obloquy and violent vituperation. But we are met here to-day under circumstances which, I think, entitle us to say, that our association has been efficient for the purpose for which it was established, and that we are now able to conduct our business in spite of all opposition to the now famous "Declaration." I am exceedingly anxious—and I am sure I speak the sentiments of all present—that nothing should be said here to-day calculated to recall for one moment any of those feelings of exasperation which have been cultivated—I must say cultivated—by those who have been active agents in the nine-hours movement, and fostered by persons in a position to have known better. The Executive Committee of the Association have had most anxious duties to discharge in watching the phases of this protracted strike. A report emanating from them will be read, setting forth in detail all that has taken

place from first to last. But there is this striking feature to which I would advert—namely, that during the whole of the strike, notwithstanding gentlemen in various positions—one a member of a profession with which we are most connected, and others who occupy seats in the Lower House of Parliament—have been busying themselves, with the view apparently and ostensibly to make up and accommodate the differences which have arisen,—not one single suggestion, nor anything approaching to conciliation or concession, has been made to your committee, which enabled them to say that they could fairly act upon it, or adopt it as a mode of amicably settling the matters then in dispute between us and our workmen. Nevertheless, we have worked steadily on in the course you prescribed to us, and are enabled now to feel that we have sufficiently accomplished the objects we all had in view; and we now come forward with such a recommendation as will place us on the footing in which we were before the strike happened,—not regretting the position which we assumed at the commencement of the struggle.

Mr. Wales then read the report, which gave an account of the strike from the commencement, and quoted the various documents which have been issued, including the "suggestions for settling the strike," made by Lord St. Leonards, and the digest prepared by him of the several Acts of Parliament bearing on the subject, to which we first gave publicity. With all the stages of the struggle, indeed, our readers are acquainted, and we need therefore print only the conclusion of the report, which is as follows:—

"An opinion by Mr. Edwin James and Mr. Gordon Allen, on a case submitted, has been published by the Conference, which pronounces the laws of the trades' unions, with one exception, to be legal. On this the committee have to remark, that the police magistrate, the Court of Queen's Bench, and the Court of Error, have pronounced and confirmed a sentence of imprisonment on the London secretary of one of these trades' unions for acting under and in accordance with the laws referred to. In other cases where individual members of the Association have sought the protection of the law against the proceedings of trades' unionists, your committee have the satisfaction to report that the views entertained by the Association have been amply vindicated by the tribunals of the country.

Your committee deemed it expedient to print the rules of certain of the trade societies, for the use of members; and the press has rendered valuable aid in publishing extracts containing details of some of the more objectionable by-laws and practices.

On a calm review of the painful events of the last few months, your committee are fully of opinion that the time had arrived when it was imperatively necessary to grapple with the whole question of the rights of master builders in the legitimate control of their business, and that the demand of ten hours' pay for nine hours' work was only another illustration and further development of the arbitrary and extravagant demands which the building operatives of London had been forcing on their employers during recent years.

The hostile attitude still assumed by the leaders of the Conference, and the threats they still issue in the columns of their organ, render it necessary that you should continue for the present your defensive organization; and your committee therefore recommend that the Central Association of Master Builders should not be dissolved until further experience shall show that it may be no longer needed.

Your committee have satisfaction in congratulating the Association on the success of the measures they were instructed to adopt. The nine-hours movement has been suspended, the strike has been officially revoked by the Conference, and the members of the Association have been enabled to resume their works.

Your committee are of opinion that the opportunity of testing the opinions and feelings of the public on the grave questions of capital, labour, and trades' unions, and of scrutinizing the acts and reasonings of the mistaken leaders of this movement, afforded by this struggle, will have diffused a large amount of valuable information which cannot but result in a better understanding of the great and important questions involved; and they trust that, in the end, the workmen will themselves see that, by separating them from their societies (as at present constituted), the masters have proved themselves their best friends. By order of the committee.

February 6, 1860. G. PLUCKNETT, Chairman."

Mr. Plucknett:—I rise to move the adoption of the report which has been read to the meeting. The committee from first to last have given their earnest consideration to the various important subjects brought under their notice during this protracted struggle. On the one hand they sought to avoid entering upon any course that might have imperilled the success of the objects for which the association was established; and, on the other, to avoid anything that might be considered harsh towards the great body of workmen implicated in the movement; and, as a member of the committee, I can conscientiously say, that during the whole of their deliberations a single remark has never fallen from any one of them in the least calculated to wound the sensibilities of any of the workmen. I congratulate the members of the association on the success which has attended its formation: both the strike at Messrs. Trollope's and the nine-hours movement have been successfully resisted, and are now at an end; and I hope and trust that the measures which have been adopted, and the proceedings here to-day, will henceforward tend to promote good-feeling between employers and employed; and that the men will see that all legitimate objects can be attained by the simple force of public opinion, without resorting to the calamitous alternative of a strike. I conclude by moving the adoption of the report.

Mr. Lucas, in seconding the motion, said the report had so fully related the proceedings of the committee, that it would be a waste of time in him to do more than formally second the resolution for its adoption. He would only say that the committee, while endeavouring to do justice to themselves, never forgot what was due to the men.

The Chairman asked if any gentleman wished to speak on the motion; and no response being made, he put it to the meeting, when it was carried with acclamation.

Sir Samuel Morton Peto, M.P., who was greeted with cheers, said,—The resolution I have to move is as follows:—"That the objects contemplated by the 'declaration' having now been accomplished, its further formal administration is unnecessary; that the suggestions of Lord St. Leonards be adopted in substitution for the 'declaration,' and that it be remitted to the executive committee to take the steps necessary for giving effect to this resolution." Gentlemen, after an association of upwards of thirty years with the master builders of the metropolis, I felt when this great question was agitated, that I could not, as I was one with you in sentiment and feeling, for one moment hesitate to be one with you in action. I was aware the course I then took as a public man would render me open to great unpopularity and much misrepresentation. Both of these I have experienced to the amplest possible extent; but I do not for one instant regret the course I then took. On the contrary, were I to-day to have the question put to me as to my conduct in connection with this matter, I should say I am prepared to indorse all that the committee has done, and I rejoice that your kind friendship has permitted me to be associated with you in this affair. The course I took was not so much from old friendships which have subsisted, and, I am proud to say, still continue with so many in this room, but from an anxious regard for the welfare of the workmen themselves. I have known and experienced, in the conduct of trades' unions in this country, a course of proceeding adopted which is more injurious, if possible, to working men than to any other class of the community. I need not point out here that a system which strikes at the root of all independent action and feeling, which impedes the working man in the free exercise of his labour, and the master in the free exercise of his position, is most injurious to both of them, and prejudicial to the interests of the whole community. When I have seen artisans in this metropolis repeatedly "blacked" because they could not conscientiously see the advantages of entering a trades-union, and when I have seen a strike recognized and adopted as a legal strike because one man, working at a building and, not being a member of a trades-union, had refused to enter one, had not been discharged,—I say the time was come when I felt that I should be identified with you on this question, not so much, as I said before, from old friendship with you as from the interest I take in the working man himself. I am not ashamed to say that I have, in common with a great number of my friends in this room, worked at almost every handicraft in the building trade, and that much of my success in life is simply attributable to that fact. But my association with working men has caused me to feel a deep debt of gratitude to them, and I felt that I could not do better than join with you in offering the most determined resistance in my power to the tyranny, worse than all others, which is implied in the despotism of the many opposed to the rights of the few. I propose now the adoption of a course which gives me unmixed satisfaction in recommending as I hope it will afford you in accepting. In following the suggestion of Lord St. Leonards, no injustice will be done to those who have come in under the "declaration." This is neither more nor less than a simple recognition, expressed in clear language, of the law as it now stands, though it has been misrepresented in a great variety of ways, and I do not think you can do better than adopt it in your various works. I recommend it as much to those who are out of employment at the present moment. It puts neither men nor masters under any new conditions. It simply states in lucid terms what the law is; and we, in a spirit of good feeling towards our workmen, only require that they will act in accordance with it. I think that is a just and graceful thing for us to do at the present moment. The "declaration," I know, is a most unpopular thing. I do not regret your adopting it; I believe it has answered the purpose exactly; but I think the time has come when you may substitute for it the advice of Lord St. Leonards, with a most perfect feeling that you are doing justice to all parties. I am sure none can be more anxious than you all are to do the greatest amount of justice to the workmen in your employ. We cannot do them a greater act of justice than to inculcate on them the necessity of saving, and of placing their savings in a position where they would be available in the time of their need. The report refers to a benefit club about to be opened in connection with the Workmen's Institute recently established. This club has been set on foot by, among other gentlemen, Mr. St. Leger Glyn and Mr. Jervoise Smith, capitalists and bankers in the City, most of them young men, anxious to discharge the responsibilites attaching to their position, and to promote the interests of working men in general; and the committee commend it to your consideration to-day, in order that you may, in your turn, if you see fit, commend it to the workmen in your employ. We must now in future, as in times past, take every possible care to show the men in our service that we are not simply using them as so many machines, but that, in the relative positions in which we and they are placed, we have an anxious desire to see them and their families living in comfort while in our employ, and in a better position when leaving than on entering it. This benefit society seems an admirable mode in which those views may be carried into practical effect, and I commend it to your notice. Let me say a word on another point. You have inaugurated a new era. You have now determined that you will pay for labour in proportion to its worth. If a man is a good workman, and able to show by his ability and talent that he is worthy of promotion to a better position, I am sure you will all feel with me that you are pledged by the lesson you have deduced from this struggle to do such a man, and every man in like circumstances in your employment, the largest amount of justice in proportion to his deserts. We all know that underlaying this protracted struggle, there has been a hateful spirit of Socialism, which simply aims at dragging all men down, regardless of their individual merits and abilities, to one common level of mediocrity. We say that every man should be paid in proportion to his labour and skill; and that is the great point at issue. Among the men in our employment, let us endeavour to discover talent, and while we take care to pay the inferior workman what he is worth, do not let it be said that any member of this Association requited the skilled artisan with less than his due. During the strike an attempt has been made to vilify the firm with which I have the honour to be connected. We are engaged in works in almost every part of the world, and we feel bound to take care that the men in our employ should not suffer from any want of provident regard on our part, or their own, for their welfare. Notwithstanding, I could scarcely ever walk the streets of London during this strike, without its being said in my hearing—"Who is it that robs his workmen every Saturday night?" We have a sick fund for the men in our employment, and on looking through the accounts, I find that during the existence of our firm, the total amount of subscriptions to that fund, by workmen, has been 31,600*l.*, while the aggregate disbursements have been actually 60 per cent. in advance of that sum. Let me just say here that I hold in my hand a letter from the Bishop of Montreal, addressed to Mr. Hodges,—a person in my own employ, and who, sixteen years ago, was only a journeyman carpenter. To him the superintendence of the works at the Victoria-bridge in Canada, constructed by my firm, was entrusted, involving the discharge of most important duties; and the late Mr. Robert Stephenson said of him that he was one of the ablest mathematicians of the age, and the first practical engineer of the day. The Bishop writes thus to Mr. Hodges, under the date of the 14th of November last:—"My dear Sir,—As the great work of the Victoria-bridge, which you have been superintending with such ability and zeal for the contractors, is now so nearly approaching completion, I wish, before your connection with Montreal altogether ceases, to express to you, on behalf of the church over which I have been placed, my grateful thanks for the readiness with which, as the agent of the contractors, you have at all times assisted us in making provision for the spiritual oversight of the numerous persons in your employ. I have no doubt you felt that in the circumstances in which you were placed, you were simply discharging your positive duty; but it is by no means the rule that such duties are always so cheerfully and fully acknowledged; and I trust that the very liberal example thus set by you and your principals, in providing salaries for the clergy and schoolmasters who were to have the care of your people at Saint Anne's and at Point St. Charles, and also your own large contributions recently given, will influence those who shall succeed you, and that it will lead to the permanent establishment of the church and schools in connection with the railway depôt and works at the latter place." My object in adverting to this circumstance is to show that we do not stand in a position of anything like coercion which has been so blindly and malignantly imputed to us. But you have initiated a new era, and I trust that no one shall ever point to the master-builders as a body who desire to raise themselves in prosperity and comfort at the expense of those below them, but who desire rather that every man shall have opportunities of rising in the world, in proportion to his abilities and good conduct.

Mr. George Smith in seconding the resolution, said the committee, of which he was a member, had been accused out of doors of tyranny and all sorts of harsh conduct. He had attended every committee meeting, and he could honestly say that he had never heard an observation drop from any member of it in any way likely to injure the workmen. Their anxious wish, all through, had been to carry out what he believed to be imperative on them, but with as little harshness as possible. Adverting to the remarks of Sir Morton Peto, as to opportunities being afforded to workmen to better their position, Mr. Smith said he knew of no trade that offered so many facilities for that as the building trade, although the capital required for large works was undoubtedly great. He had been struck with the unceasing objections which deputations of workmen who had come before the committee made to piece-work, while in almost the same breath they urged the apparent impossibility of an artisan raising his position. Mr. Smith proceeded in facetious terms, which caused some merriment, to describe the various attempts made at conciliation by persons not concerned in the dispute; especially commenting on the manner in which Mr. Marsh Nelson and Mr. Ayrton had put themselves forward with that view. He denied in indignant terms that when the committee had an interview with Sir George Lewis, the Home Secretary, their object was to ask for Legislative interference. Mr. Piper, on the contrary, told Sir George Lewis that they were there for no such purpose; and yet Mr. Ayrton, who thrust himself into the room during the interview, had heard it asserted over and over again, that their object in going there was to ask for Legislative interference, and had never had the manliness to contradict it. He (Mr. Smith) regretted to say he believed that of all the metropolitan members Sir Morton Peto was the only one who had had the manliness to come forward and state what must have been their convictions on this question. If they were men of sense they ought to have come forward months ago, and told the people what must have been the inevitable result of this struggle. But what did they do? Why, they wrote meaningless letters hounding on these men to destruction; when a little more manliness, a little more of what he called English spirit, on their part, might have shortened the duration of this unhappy dispute by months, and saved the lives, probably, of many individuals.

The resolution was then put, and carried unanimously.

Mr. W. F. Palmer, with much feeling and sympathy for the workmen at large, commended the benefit club to the support of the meeting as a means of ameliorating their condition; and he moved: "That this meeting cordially welcomes the efforts of those gentlemen who have originated the Workmen's Institute, and pledges itself to its support."

The motion was seconded by Mr. W. Norris, and carried *nemine dissentiente*.

On the motion of Mr. W. Horner, seconded by Mr. J. Abbott, the best thanks of the Association were unanimously voted to the executive committee for the efficient manner in which they had transacted the business of the Association.

The cordial acknowledgments of the Association were also passed by acclamation to Mr. Thomas Piper for his conduct in the chair, on the motion of Mr. J. C. Lawrence, seconded by Mr. R. Hannen.

The chairman briefly acknowledged the compliment, and with that the proceedings terminated.

THE CHIEF STONE OF VICTORIA BRIDGE, MONTREAL.—The builders have left a stone unlaid—a corner stone—of the great railway bridge at Montreal, in hopes that one of our royal princes may pay them a visit in the spring, and inaugurate the completion of this great work.

THE WAR OFFICE AND "CONTAGION."

SIR,—In the last *Builder* there is a good letter signed "Cwm," on Camp Hospitals, containing a curious piece of information to me, although I am pretty well *au courant* in sanitary matters. He says that the Secretary of State for War has issued a regulation for carrying out the old witch incantations over dirty linen, including fumigation and other absurdities, with the view of exorcising the evil spirit known in modern times, under the cabalistic name of "Contagion." I at first thought your correspondent had got hold of an order of the time of the hundred-year-old book he discusses, but on making diligent search I have actually obtained the circular dated from the War Office, on Waterloo day, 1859. The better day the better deed. In this paper, Secretary Major-General Peel actually issues special directions, under the hand and seal of Sir Benjamin Hawes, giving the most minute details of how the devil is to be got rid of!

It is clear that sanitary reform had not reached Pall-mall even at that date.

I have also looked through the new army medical regulations to see how the contagion affair is disposed of by them; and I find that within less than four months, namely, on the 7th of October last, Mr. Herbert undoes all this, and not having any faith in the evil one in question, simply prescribes that "bedding which has been used by patients affected with epidemic diseases should be steeped in water, dried, and exposed to the air, and afterwards washed with soap and water." This is a good, healthy rule, and it shows that in the War Office it is possible to pass over a century of superstitious observances in a quarter of a year. Would that all other equally antiquated War Office observances were passed over as speedily.

X.

FRENCH AND ENGLISH INVESTIGATORS.

READING the interesting article in the *Builder* on M. Beulé's papers on Greek art, translated from the *Revue Générale de l'Architecture*, I was sorry to find that M. Beulé has been guilty of a plagiarism. In 1851, I published, in my "Museum of Classical Antiquities," a proto-Doric column (one of three), which I discovered at Thebes, and I gave a plan, in which I pointed out their position. To my great surprise and concern, I discover that M. Beulé has copied this cap in the *Revue Générale de l'Architecture*, and calls it "from Elephantina," in order to conceal his theft and make his own *discovery* the more important.

Another Frenchman, M. Ernest Breton, was equally dishonest in his wretched compilation on Pompeii. He copied the plates I published of the house which I excavated at Pompeii, without referring to me either as the excavator or author, and altered the names, pretending that I was mistaken in my appellation, although, had he been able to read English, he could not have made such a mistake as not to know a triclinium from any other room.

EDWARD FALKENER.

THE PROPOSED GARRISON HOSPITAL AT WOOLWICH.

IN the *Builder* of 3rd September last it was stated that it had been determined to build a garrison hospital at Woolwich, for 650 beds, and the several suitable sites which present themselves in the immediate neighbourhood of the barracks,—close neighbourhood being an essential point of advantage,—were very briefly enumerated. On the 5th of November, the newspapers having announced that a particular site had been fixed on, it was pointed out that there is an insuperable sanitary objection to that site, it being the one side of a narrow, closed valley. It now appears that that has been abandoned; and we quote a very well-accredited local rumour when we say that Kidbrook-common has been purchased by the War Department, and that on it the hospital is to be erected. Mystery and reserve are the shields with which sub-official feebleness naturally endeavours to protect itself from criticism; and perhaps we shall not know the exact truth until the Army Estimates are laid on the table of the House of Commons; but it is certain, at any rate, that, if not actually purchased, the ground mentioned is that to which official eyes are now turned.

Kidbrook-common is the strip of furze-covered clay land which is immediately on your right hand as you turn from the Dover-road towards Eltham. It is just below Sevendroog Castle, on Shooter's-hill, well known to all Cockneys. It is a gentle slope, just in front of which is a conical hill, presenting, on its nearest face, the Greenwich and Deptford burial-ground.

If the ground has been purchased, and if there is no chance of a withdrawal from the decision to build there, perhaps all that need be said is that the future building will be, as far as mere situation goes, and provided the eyes and nose can be kept free from the near graveyard, one of the most agreeable residences in the neighbourhood of London, replete with "residential amenities," as George Robins used to say, quite sheltered from the bitter north wind, and from the Kent marshes, with a glorious prospect towards the Cray country on one hand, and, as to the other, that when the whole system of waterworks at the Crystal Palace is in full play, with the great volume of water gilded by the setting sun of an autumn evening, there will be so charming a prospect that the sick must become well, and the whole must strive to become sick to enjoy it. So much may be safely said; but if there is still time for a little friendly criticism, there are two or three questions that may not seem to be irrelevant. For instance, why should a hospital be built on a piece of ground where, bore as deeply as you please, you find nothing but clay and water? Why divert the Common from the purpose for which nature intended it,—that of a brick-field; a purpose properly and profitably carried out within a few hundred yards? When the line of separation betwixt the clay and the gravel occurs at a point between the barracks and the proposed site, why should you select that side of the line on which the clay lies, and which is most remote from the barracks? How is the water-supply to be obtained? If, by the bad method of sinking wells, it can safely be said that there is every prospect of an abundance being found: if, on the other hand, the water is to be procured at high-pressure, is Shooter's-hill, the only higher ground within a large circle, relatively high enough? Above all, and before all, why is a Woolwich Hospital to be built at Shooter's-hill? And this objection is a quite insurmountable one. The fact that it can be urged sufficiently shows that this new site can have been sanctioned by no one who knows anything whatever of the requirements of a regimental hospital, or of the interior economy of a regiment, in the routine of which the hospital is so important a feature.

One would almost suppose that the gentlemen charged with the duty of selection had caught the echo of a recent discussion, and were determined to carry out the mere words of it, quite irrespective of the meaning, and altogether ignoring the very substantial grounds on which it has been raised. Some persons have proposed, on strictly sanitary grounds, to remove the large civil hospitals of densely populated towns towards the country. Others, again, among them Mr. Kingsley, prominently and, it need not be said, very eloquently, have carried the idea further, and have proposed to remove the town population of labourers and hand workers in the same direction. Excepting in the interest of details of convenience and expense, there can be nothing but sympathy with the proposal. One can quite understand that if St. Thomas's Hospital, for instance, were moved along the South-Eastern line to some breezy upland down in Kent or Sussex, it would be a very great sanitary advantage. But the case of a regimental hospital is in all respects and altogether different. Any one who knows the constant—more than hourly—communication that must be carried on between the regiment and the hospital, how much more is transacted between them than what affects merely the sick men in hospital, must know that if the hospital is at all remote, the routine of duty becomes, of necessity, injured and stagnant. It is a primary and essential necessity that the barrack and the hospital must be in close contiguity one to the other. If the one is moved, the other must be moved. In this particular instance, if it appeared that it was impossible to find a suitable place for the hospital in the neighbourhood of the barrack, so absolute is the rule that has just been laid down that very serious questions would arise; but that is not necessary, because, as has been pointed out before, there are admirable sites in the immediate neighbourhood.

And, assuming that Kidbrook-common has not yet been purchased, one would like to say a word or two in favour of the piece of ground which was called site D, in the *Builder* of September 3, viz., the field on the right of the road to Charlton, as you go from Woolwich, and between Maryon-road and the Charlton Park-wall.

Every one who has travelled lately up or down the river must know that a Marine Hospital has just been built, immediately on the proper right of the Marine Barracks. It is so high that it dominates over the town and neighbourhood. When one stood on the paddle-box of the *Great Eastern*, off Deptford, last summer, the two proudest looking buildings that the eye could see were St. Paul's and this new hospital! Now, wishing to advocate site D, what we would ask any one who is interested in the matter to do is this,—to place himself at one of the windows of the architectural front of the Marine Hospital, and then to look to his front. He will thus have a capital view of the extensive field suggested; will see, at a glance, its many capabilities; and will proceed to discover, it may be safely asseverated, that there cannot be a single sanitary objection raised to it. He will see, too, that the field is on much the same level as that of the building at which he is standing, and then he can allow his imagination to picture the effect of two such buildings, facing each other; the one representing the most recent efforts of one great public department, the other of the other. In the Marine Hospital there is too little interval between the pavilions. The space was very limited, and a certain amount of sanitary advantage has been sacrificed for the sake of close neighbourhood to the barracks and dockyard. Site D would admit of any amount of space. If, however, Kidbrook-common is to be the site, every consideration that ought to be taken into account will have been sacrificed, and—for what?

CWM.

BUILDERS' ACTIONS.

ERRONEOUS QUANTITIES.

Sherren v. *Harrison*.—This action was tried in the Court of Queen's Bench (Second Court), before Mr. Justice Blackburn and a special jury.

Mr. M. Chambers, Mr. Day, and Mr. Martin were counsel for the plaintiff; Mr. Hawkins and Mr. Archibald for the defendant.

The plaintiff, a builder, sued the defendant, a clergyman, to recover a balance of 1,483*l.* 17*s.* 9*d.* for extra work done beyond that specified in the contract and specification. The defendant paid into court 209*l.* 15*s.*, and said that that sum was sufficient to satisfy the plaintiff's claim.

It appeared that the defendant was a clergyman of the Church of England, and was desirous of building a small church at Northumberland-park, Tottenham, Middlesex, and in January, 1858, inserted an advertisement accordingly for plans, &c., in the *Builder*, for a small church, to cost 2,000*l.* Mr. Mumford became the architect, and, as the plaintiff stated, induced him to become the builder and sign the building contract. The working drawings and estimated quantities were supplied by Mr. Mumford to the plaintiff, and there was sufficient evidence given to establish that he was acting as agent on behalf of the defendant. But the plaintiff's case was, that the estimates and quantities so supplied to him by Mr. Mumford were so incorrect and false that they amounted to a species of fraud upon him, inasmuch as he was induced by means of them to sign the contract to do the work for 1,998*l.*, whereas, when the work was subsequently done and quantities calculated, the cost was found to amount to 3,600*l.* The miscalculations had been shown by Mr. Eppy, of Lincoln's-inn-fields, and his statement was corroborated by Mr. Lewis and Mr. Lee, of the Adelphi. Mr. Mumford's estimates were said by the plaintiff's witnesses to be such as were very likely to mislead the plaintiff, who had been chiefly engaged in building public-houses, and had never previously built a church, and moreover, that in them the quantities were quite incorrect. The written contract contained a stipulation that no extras were to be done or charged for without a written order from the defendant, and signed by Mr. Mumford. For the extra work done in this case there were no such written orders.

Mr. Hawkins, at the close of the plaintiff's evidence, submitted that there was no case, and that the plaintiff was bound by the written contract, however improvident the bargain he had made might be; and that as there was no written order for the extras by the defendant, and no certificate by the architect, the plaintiff was not entitled to recover.

Mr. Chambers contended that the plaintiff was entitled to recover on this ground,—that Mr. Mumford's drawings and estimates amounted to a fraud practised on the plaintiff, and that the defendant, having employed Mr. Mumford as his agent, was bound by his acts, and that, in fact, the case was the same as if the defendant himself had prepared and submitted the drawings and estimates to the plaintiff; and, further, that the contract, not being one under seal of the parties, it was competent to them to waive it by parole, and that there was evidence that the stipulation as to requiring a written order for extras had been waived.

The learned Judge ruled that there was no evidence to go to the jury on the question of fraud, and that, as to the extras, the written contract was binding, and that there was no evidence of waivor. He then directed the plaintiff to be nonsuited, reserving leave to the plaintiff to move the court above to set aside the nonsuit on the grounds taken as above by Mr. Chambers.

Some will think that the action was brought against the wrong person.

CO-OPERATIVE ASSOCIATIONS.—A co-operative association has been formed amongst certain of the artisans of Wolverhampton. Their numbers are not larger than thirty, and their capital about as many pounds; but the society is yet in its infancy. A store has been established for the sale of groceries. The brickmakers and colliers of parts of South Staffordshire and East Worcestershire are discussing the feasibility of forming similar associations in connection with their respective trades.

Books Received.

Recent Practice in the Locomotive Engine (being a Supplement to "Railway Machinery"), comprising the latest English Improvements; and a Treatise on the Locomotive Engines of the United States: illustrated by Plates, and Engravings on Wood. By DANIEL K. CLARK, C.E., and ZERAH COLBURN, C.E., New York. Blackie & Son, Warwick-square, London. 1860.

THIS able and useful supplement to Mr. Clark's treatise on "Railway Machinery" is now completed with the tenth part of the series. The work is designed to illustrate and investigate the practice of English locomotive engine-makers at the present day, and to present the most recent attainments in American practice. One important point, treated of at length, is that of the use of coal in locomotives, which, Mr. Clark thinks, will in a few years be general: the opinion is now in rapid progress of fulfilment.

The American division of the work, by an American engineer of good repute, may be studied with advantage by the English engineer. It is interesting for the research and originality it displays, and valuable, as Mr. Clark's own share in the work is, for the really practical information it affords.

The Year-Book of Facts in Science and Art. By JOHN TIMBS, F.S.A. London: Kent & Co., 86, Fleet-street. 1860.

MR. TIMBS'S Year-Book is as fresh and full of interest as ever, and affords us some of the pleasantest reading and reminiscence of the whole year round. But really we have now so often had occasion to speak in similar terms of this valuable compendium of the year's labours in scientific and art discovery, that the simple announcement of a new issue we are sure is all that our readers require of us to induce them to make it their own, by the investment of the small sum demanded for it at the hands of its publishers. The present volume is illustrated with a fine engraving of Captain M'Clintock, R.N., the Arctic voyager, and a wood-cut of the new naval "bruiser," called "The Warrior."

A Manual of Domestic Economy; with Hints on Domestic Medicine and Surgery. By W. B. TEGETMEIER. Fifth edition. London: Groombridge & Sons, Paternoster-row. 1860.

FOUR large editions of this little work, it seems, have now been sold, and a fifth is called for, and now issued after revisal and enlargement; thus justifying the good word we have ere now spoken for it. As our readers may recollect, it was prepared at the request of the Committee of the Home and Colonial School Society, by the author, who is the lecturer on Domestic Economy at the Training Institution in Gray's-inn-road; and the book is published, indeed, for the School Society just named.

Miscellanea.

WHOLESALE COMMEMORATION.—It is stated that a society has been formed at Antwerp which intends erecting a colossal monument to all the celebrated men of that town, in the shape of a pyramidal structure, bearing forty-four statues, with an allegorical figure at the top, representing the city of Antwerp crowning her sons. The monument is to be 200 feet high: the expense is calculated at 300,000 francs. It is to be erected at the crossing of the principal avenues on the Boulevard Leopold. M. Cuyper is the sculptor. The architect, M. Redig, has undertaken the architectural part of the monument.

MONUMENTAL.—A monument, of Peterhead polished granite, from a design by Mr. Scott, of Dundee, executed by Wright, of Aberdeen, has just been erected in Broughty Ferry, near Dundee, in memory of the late Dr. Dick. The design consists of an obelisk, 14 feet high, upon a pedestal of corresponding character. The ground is laid out with plants, and enclosed with chains, hung upon small obelisk pillars, in harmony with the monument.——A raised altar-tomb has been placed in the Priory churchyard, Brecon, to the memory of the late Major Lumley. The tomb, which is from the *atelier* of Mr. W. Jennings, sculptor, Hereford, is in the Mediæval style. It is formed of sandstone from Springfield, in Yorkshire, and is surmounted by a plain white marble cross, in keeping with the style of the tomb, as is also the railing which surrounds it. The panel bears the inscription.

THE MONSTER ANVIL BLOCK AT NEWCASTLE-ON-TYNE.—The enormous casting, by Morrison & Co., on the Tyne, weighing upwards of twenty-one tons, intended for the new ordnance works, Woolwich, under the control of Sir William Armstrong, was removed from the casting-house, on Tuesday last, on a waggon weighing above seven tons, well constructed, and drawn by a magnificent team of twenty-eight horses, some of them 17 hands high, belonging to Carver & Co., carriers, in Newcastle, to the Trafalgar station.

ASSOCIATION OF FOREMEN ENGINEERS.—At the meeting of this Society, held on Saturday, the 4th inst., at their rooms in the city, Mr. Newton was re-elected chairman for the ensuing year. Several new members, honorary and ordinary, were afterwards elected. A "rate in aid" of the library fund of the society, which, it seemed, was at a low ebb, was put and carried, and a Library and Printing Committee nominated. The announcement of a paper, to be read by Mr. Robertson, on the History of the Iron Trade, at the meeting on the 3rd proximo, closed the proceedings.

LONDON SHOE-BLACK SOCIETIES.—At the annual treat of the boys of the various shoe-black societies of the metropolis, held on Monday evening, Mr. G. Oliphant said, that the boys of the shoe-black brigade had earned such a sum of money during the past year as would astonish the public. The Ragged School Shoe-black Society, consisting of 60 boys, in red uniform, had earned 1,746*l.*; the East London Shoe-black Society (blue), 104,—1,094*l.*; South London Shoe-black Society (yellow), 40,—669*l.*; North-West London Shoe-black Society (white), 16,—140*l.*; West Kent Shoe-black Society (green), 13,—120*l.*; West London Shoe-black Society (purple), 15,—216*l.*; Islington Shoe-black Society (brown, red facings), 26,—240*l.*; Notting-hill Shoe-black Society (blue, red facings), 26,—200*l.*; Union Jack (Limehouse) Shoe-black Society (red, blue facings), 18,—133*l.*; making a total of 318 boys, and the earnings 4,548*l.*

THE STRIKE AND COUNCILS OF CONCILIATION.—A public meeting, numerously attended by operatives of various trades, has been held in the Town-hall, Macclesfield, the object being "to devise means of raising subscriptions in aid of the London lock-outs, and to adopt Mr. McKinnon's Bill on Boards of Conciliation, so as to prevent such calamitous lock-outs in future." Mr. John Bancroft, weaver, occupied the chair, and besides the Rev. E. A. Verity, "Honorary Advocate of the London Lock-outs," there were on the platform several working men representing different trades. Mr. J. H. Patching, Advocate from the Builders' Conference, London, gave an outline of the history of the builders' strike in London; and resolutions were unanimously agreed to in support of the operatives out of employment on account of the strike, and also in favour of Councils, of Conciliation, as desired to be established under Mr. McKinnon's parliamentary bill.

DRAINAGE AND DRYING OF WELLS.—The new River-Water Company, in making a drain at Hertford, happened to withdraw the water from some wells there, and the local magistrate found them liable in damages to one person to the extent of 2*l.* 16s. Against this decision the Company appealed to the Court of Queen's Bench, who have quashed the magistrate's order, but without costs, holding that no action would lie, as "the company must be considered, under their Act of Parliament, in the light of owners of the adjoining soil," whether as regards the interception of water before it reached the respondents' well, or its abstraction after it was collected there. The decision, according to the *Herts Mercury*, imposes the necessity of sinking their wells deeper at their own cost, upon a large proportion, of the townspeople of Hertford.

PURIFICATION OF THE THAMES.—A proposal for the purification of the Thames has been communicated to the French Academy of Sciences by M. Grimaud, of Caux. M. Grimaud's proposal is to make two sewers parallel to the river's course, down to the point where the water is perfectly salt. A bar constructed across the Thames above London would bring the sewers in communication with the river, and enable them to be flushed at low water every day. M. Grimaud thinks that a frightful pestilence will one day be the consequence of sanitary neglect in London, as the city is built exactly where the stream becomes stagnant by its meeting with the water from the sea. He takes his project from the method practised at Venice, which, he asserts, has kept the canal wholesome, although the whole sewage of the city is emptied into them.

ROYAL LYCEUM THEATRE.—We have been wanting an opportunity to mention the transformation-scene at the Lyceum, now under the management of Madame Celeste, one of the few managers who has the art of improving actors. It involves a looking-glass lake amid a grove of ferns, and is singularly artistical and beautiful. Mr. William Calcott is the artist who produced it. "The Tale of Two Cities," whatever it may have been on the first night, is now an effective and interesting piece, exceedingly well acted by Madame Celeste, Mr. James Vining, Mr. Villiers (a promising artist), Mr. Walter Lacy, Mr. Rouse, and Miss Saville.

WIDENING THE HOLBORN END OF CHANCERY-LANE.—A new opportunity, occasioned by a fire, it seems, has occurred for the widening of this thoroughfare, which has long been a desideratum; and Mr. J. R. Taylor is again endeavouring to effect the object in view, by presentation of a petition, through Lord Brougham, to the House of Lords. Considering the great improvement such a widening as is required would confer on the locality, owners of property in the lane, including the Society of Lincoln's-inn, Lord Radnor, and others, ought to do something in the matter in the first place, and the Metropolitan Board of Works might then be called upon to assist; but we suspect that an application to the House of Lords is beginning at the wrong end. There is great need of the improvement in question, as Chancery-lane is a constant omnibus and cab route, and vehicles and their drivers are continually coming into conflict and obstructing each other at the Holborn end of the lane.

ARCHITECTURAL CONVERSAZIONE AT WORCESTER.—A gathering of the members of the Worcester Diocesan Architectural Society and their friends took place last week at Sansome Lodge, where a suite of convenient rooms has been placed at the use of the society for similar meetings, by Mr. A. J. Hopkins and Mr. J. S. Walker. This was the first of a series. About forty persons were present. Mr. Walker, one of the honorary secretaries of the society, explained that the intention of these meetings was, to bring the members of the society and their friends together for the discussion of architectural and antiquarian subjects, not so much by formal papers as by conversation. The Rev. J. D. Collis, however, read a paper "On the Styles of Gothic Architecture," and afterwards Mr. Walker pointed out the principal examples of the various styles to be found in the district. The company then devoted their attention to the various objects of interest, such as architectural drawings, photographs, &c. Next they took tea and coffee, and the chairman read a paper "On Block-printing." Some conversation followed; and the meeting broke up.

BITUMENIZED "PAPER" PIPES.—The ingenious idea of hardening paper by means of an admixture of bitumen under the influence of hydraulic pressure, so as to convert it into a substitute for iron, is due, it appears, to M. Jaloureau, of Paris. The world has already become familiar with the utility and value of *papier maché* as a substitute for stone or marble in moulding, architectural castings, busts, and statues: it has also heard recently that the Chinese constructed their cannon of prepared paper lined with copper, and that they even make paper pipes,—that an eccentric character at Norwood has built himself a house of paper,—and that our American friends have invented a veritable paper brick;—but nothing, it is believed, has lately come before the British public, in the way of paper, so curious, and yet practicable, as these bituminous paper pipes. Testing experiments, conducted under the great clock-tower at the Houses of Parliament, are reported to have "proved that the material, while it possessed all the tenacity of iron, with one half its specific gravity, had double the strength of stoneware tubes, without, moreover, being liable to breakage, as in the case of other material, and which frequently causes a loss to the contractor of some 20 or 25 per cent. on the supply." In order to test their strength, two of these bituminous paper pipes of 5-inch bore and half-an-inch thick were subjected to hydraulic power, and they are said to have sustained, without breaking or bursting, a pressure of 220lbs. to the square inch, or equivalent to 506 feet head of water. The cost of the pipes is understood to be about one-half the cost of iron. Specimens of pipes employed in the transmission of gas at the Palace des Invalides during the last eighteen months were exhibited by Messrs. Joske & Young, the proprietors.

PUBLIC IMPROVEMENTS. — A bill has been brought into Parliament by Mr. Slaney, and read a first time, the object being to enable a majority of two-thirds of the ratepayers of any parish or district, duly assembled, to rate their parish or district in aid of public improvements for general benefit within their district, a certain proportion being before raised by donations and subscriptions. The bill would be permissive and enabling, and only where two-thirds of the inhabitants thought a particular object desirable, and half the calculated expense was subscribed.

DANGERS OF ARTISTS.—It may be as well to say, with reference to Mr. Papworth's observations, that the narrow escape of an artist alluded to in the paper, headed "An Ermined Architect," referred to Sir James Thornhill, some time Serjeant Painter to the King, and father-in-law to Hogarth. The same escape has been attributed to the same painter while employed in decorating the dome of St. Paul's Cathedral: it would equally illustrate the position taken in the article. The statement of the frequent loss of life from false steps on a scaffold is corroborated in the paper read by Mr. Barry, on Monday evening, at the Royal Institute of British Architects, and which we print elsewhere.

THE NORWICH SURVEYORSHIP. — Mr. E. E. Benest having tendered his resignation, which has been accepted, the town council have resolved to advertise for a new surveyor and architect, according to a recommendation of their city committee, "that the person to be appointed to such office should be required to perform the entire work of the corporation, including that connected with the Board of Health and Burials Board, and be alone responsible for the due performance of all such work. That the salary should be 350*l.* per annum, and that the person receiving the appointment should not be restricted from taking private practice, provided the same does not interfere with the duties of his office under the corporation, or prevent such duties from being efficiently performed."

THE CHELMSFORD TOWN SEWAGE.—The surveyor to the Local Board of Health reported recently, that the Messrs. Marriage had expressed their willingness to take the sewage, the board laying down all the pipes, sluices, &c., and pumping the sewage to any spot required, to a height of not less than 55 feet or 60 feet; Messrs Marriage to pay 5 per cent. on the outlay, and such annual rent as should be agreed upon; the lessees to take up the pipes in the event of their quitting their occupation, in which case the rent was to cease. The sanitary committee had decided that this proposition could not be entertained, but directed the surveyor to intimate to Messrs. Marriage that they would be willing to entertain any reasonable proposition which did not require them to pump to a greater height than at present. Messrs. Marriage had declined to treat with the Board under that limitation, but the surveyor had since had another proposal from these gentlemen, who were willing to pay 11 per cent. on the outlay, and 50*l.* per annum towards the expense of pumping, in addition to a rent of 30*l.* The surveyor added, that for this arrangement they would require a second engine, but not a second establishment. He suggested that the matter be referred to the sanitary committee, which was agreed to.

PROVISION FORCING.—IN the "good old days," which some like to talk about, and compare with the present, there was but a very limited supply of vegetables, and even fruits. In those times, in some measure in consequence of the scarcity of those supplies, leprosy, and some other diseases, prevailed. Each year improved skill caused the early and late production of these edibles. To these accustomed to the old fashion of gardening, a visit to some of the nursery-grounds which skirt London surprises. Here, in the midst of the winter snow, rhubarb and other plants may be seen struggling towards perfection by the aid of ventilated glass-frames and the extensive use of various kinds of manure. In the same scientific manner, geese, turkeys, and chickens, are raised for the markets. In such establishments these feathered tribes are not permitted to roam in the stubble-fields and meadows, but are lodged together in crowds, and supplied by a regular system with food. By this means, in a short space of time, the birds grow to a large size. Poultry, in fact, is manufactured, so much corn or other food being allowed to produce so many pounds of goose or turkey, and allow profit. Large as is the increase of the quantity of provisions and vegetables by this system of forcing, it is a question if the flavour and quality are improved by the process.

ROMAN ANTIQUITIES DISCOVERED IN FRANCE.—At Vienne (Isère), a fine Roman mosaic has just been found. It is in a dining-saloon or triclinium, about 20 feet wide by nearly 35 feet long, forming part of a Roman habitation recently discovered. The whole is divided into compartments, some octagon and some square, separated by coloured bands. The whole mosaic, which is surrounded by a white and black border, is decorated with figures representing Orpheus charming animals with his lyre; a design of which there are several examples in this country.

METROPOLITAN BOARD OF WORKS: TENDERS FOR SOUTHERN SEWER.—At a meeting of the Board, on the 3rd instant, it was ordered that, in consequence of Mr. Rowland Brotherhood having declined to proceed with his tender for the southern outfall sewer, fresh tenders for the work should be invited, to be received in a month. Mr. Leslie gave notice of his intention, on an early day, to call attention to the section of the Metropolis Local Management Act which related to members of the Board interested in any contract executed for the Board, or who should act as a member of the Board after ceasing to be such member. A notice respecting the widening of the upper end of Chancery-lane was given.

NEW SCHOOLS AT HASLINGTON, NEAR CREWE, CHESHIRE.—On Wednesday, February 1st, St. Matthew's Schools, Haslington, near Crewe, were opened after Divine service in the church. Three hundred and fifty persons, chiefly parishioners, took tea in the new schools, and the meeting was addressed by the Rev. J. Bardsley and other clergymen. The Rev. Charles White is the incumbent of Haslington, to whom the greatest thanks are due for his strenuous exertions in founding and establishing the schools, which are so greatly needed. Mr. James K. Colling, of London, was the architect, and Mr. John Buckley, of Davenham, Cheshire, the builder. The amount of the contract was 1,080*l.*

THE HOLME RESERVOIRS AT HOLMFIRTH.—In his yearly report, Mr. Bateman, the engineer employed by the directors of these reservoirs, says,—"At the Holme Styes Reservoir I am sorry to say that the repairs which were alluded to in my last report have not been as effective as was anticipated. There is evidently still some defect in the puddle-lining, and the water must be again drawn down for repairs. It was emptied for examination in June. The puddle-lining was found to have failed in several places. It was made good as was supposed, and the reservoir filled, being full and overflowing by November. It is not yet, however, perfect. The Bilberry reservoir remains in the same state, gradually getting better, but occasionally failing and requiring repair."

THE DRINKING-FOUNTAIN MOVEMENT. — At Pontypool, a fountain has been erected, near the Town-hall, and thrown open for the use of the public. The design was by Mr. R. G. Thomas, architect, Newport, and executed by Messrs. A. & J. James, of that town. The base is composed of Forest of Dean stone, decorated with rusticated work; the buttresses of serpentine marble, forming pillars, the caps carved, and the termination of the buttresses consist of Bath stone, carved on angles. The basin of light marble into which the water flows is carved as a shell, and supported by an ornamental corbel. The water runs from a bunch of flowers, and passes through a water lily of statuary marble. This is surrounded by a niche of birds and foliage, geranium leaves and blossoms, the termination of the label over the niche representing maple and oak, a dog being entwined in the former, and a stag in the latter. The arms, crest, and motto of C. H. Leigh, esq., are also carved in statuary marble, surmounted by a band with the inscription,—"Presented by Mrs. C. H. Leigh, 1860." The hood mould is made of Bath stone, the top forming a *fleur-de-lis*. The drinking cups are of iron enamelled, and chained. The water passes into a stone trough, accessible to canine and other quadrupeds.——There has risen up in Newcastle, says the *Gateshead Observer*, in the square of St. Nicholas, a drinking-fountain, with a lamp-post on its summit; and on the summit of that a monster lamp, crested by a Grecian temple! As a work of art, it is a most absurd production, and may well justify a stranger in asking, "Is there no School of Design in Newcastle?" Surely, if a site between the old church of St. Nicholas and the new town-hall was to be occupied by a lamp and fountain, care should have been taken to secure, from some architect or artist, a suitable design. The present "composite candlestick" excites the amazement of passers-by. Cannot the water of the fountain be made to play over the temple, and veil the incongruous superstructure?

VALUE OF LAND: CROYDON. — When arrangements were being made last year between the London, Brighton, and South Coast Railway Company and the Mid Kent Railway Company, and the former agreed to erect a junction station at Norwood for the reception of the Kent traffic, the Brighton Company, through their surveyor, Mr. F. Fuller, purchased the land for the purpose, and having no Act of Parliament to compel the landowners to sell, were in a great measure at their mercy, and as a consequence had to purchase seven acres more land than the Company required, at the rate of 500*l.* per acre. These seven acres were sold by auction, by Messrs. Fuller, on the 26th of January last, at the Mart, and realised no less a price than 830*l.* 10s. per acre.

NEWSPAPER ADDRESSING MACHINE.—An American invention, patented by the Rev. James Spencer, editor of the Toronto *Christian Guardian*, for the facilitation of the tedious process of addressing newspapers at the publishing offices, is described in the Cincinnati *Scientific Artizan*. It is called a "mailing machine." By means of this invention, it is said, a youth of fourteen or fifteen can address 5,000 papers in two hours and a half, whereas, to address so many by hand, it is said, one clerk would take forty hours, or four clerks ten hours. By the machine, the addresses are printed directly on the newspaper, or on the wrapper.

GLASS, *Newport (Isle of Wight)*.—Two sections, forming part of the great window proposed to be placed in St. Thomas's Church have been forwarded to the churchwardens for inspection, and have been placed in one of the chambers of the Town-hall. They consist of two designs, completed in stained glass, from the original plans of the artist, Mr. Holland, of Warwick. The first, having an arched top, represents the angel appearing to the Virgin Mary, with the Holy Ghost descending on her in the shape of a dove. Underneath the design are the words, "Blessed art thou among women." The subject of the other section, a square one, is "Christ's Entry into Jerusalem on an Ass."

BUILDING PROGRESS IN LIVERPOOL. — The annual report of Mr. Rishton, the building surveyor, states that the number of dwellings erected, or in course of erection, during the past year, was 1,758, or 41 more than in the previous year—considerably more than in any other similar period for the last twelve years, and about four times as many as were erected in 1849 and 1850 respectively. Many of these houses do not exceed two stories in height: they are let at rents within the means of the working classes, and are constructed so as to accommodate lodgers without interfering with domestic comfort or privacy. In some instances houses have been built with two street-doors to each, on the level of the ground; one door leading to the apartments on the ground-floor, the other by a flight of steps to the apartments above; each having its own separate yard, privy, or water-closet. The tenants who occupy such houses have good accommodation at less cost than those who occupy the old, badly-built houses, destitute of every sanitary requirement. The evils arising from reckless and incompetent persons building houses on refuse deposited on excavated land still continues. The probable cost of the building operations within the borough during the year amounts to a sum exceeding 528,000*l.*, irrespective of the value of the land. Taking the new houses for the year 1858 in all, as accommodating six persons each, and taking the separate cellar dwellings, 110 in all, as accomodating four persons each, they would represent an additional population of nearly 11,000, whilst the houses pulled down in the same period are less than 120.

TENDERS

For two houses at the corner of the Minories and Aldgate, for Mr. Isaac Moses. Mr. D. A. Cobbett, architect:—

Jay	£2,869	0	0
Rivett	2,823	0	0
Lawrence	2,759	0	0
King	2,749	0	0
Hill & Son	2,690	0	0
Wilson	2,666	0	0
Ashby & Sons	2,640	0	0
Newman & Mann	2,598	0	0
Ashby & Horner	2,580	0	0
Hedges	2,574	0	0

For alterations and additions at Nos. 6, 7, and 8, Addle-street, City, for Mr. Jay. Messrs. Waring & Blake, architects:—

Ramsay	£1,315	0	0
Gammon	1,270	0	0
Woodward	1,260	0	0
West	1,247	0	0
Keys & Head	1,215	0	0
Brass (accepted)	1,157	0	